



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

### **Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

### **About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

191163  
d ab



600020266M

*Q. 64. d. 11.*

OXFORD MUSEUM.  
LIBRARY AND READING-ROOM.

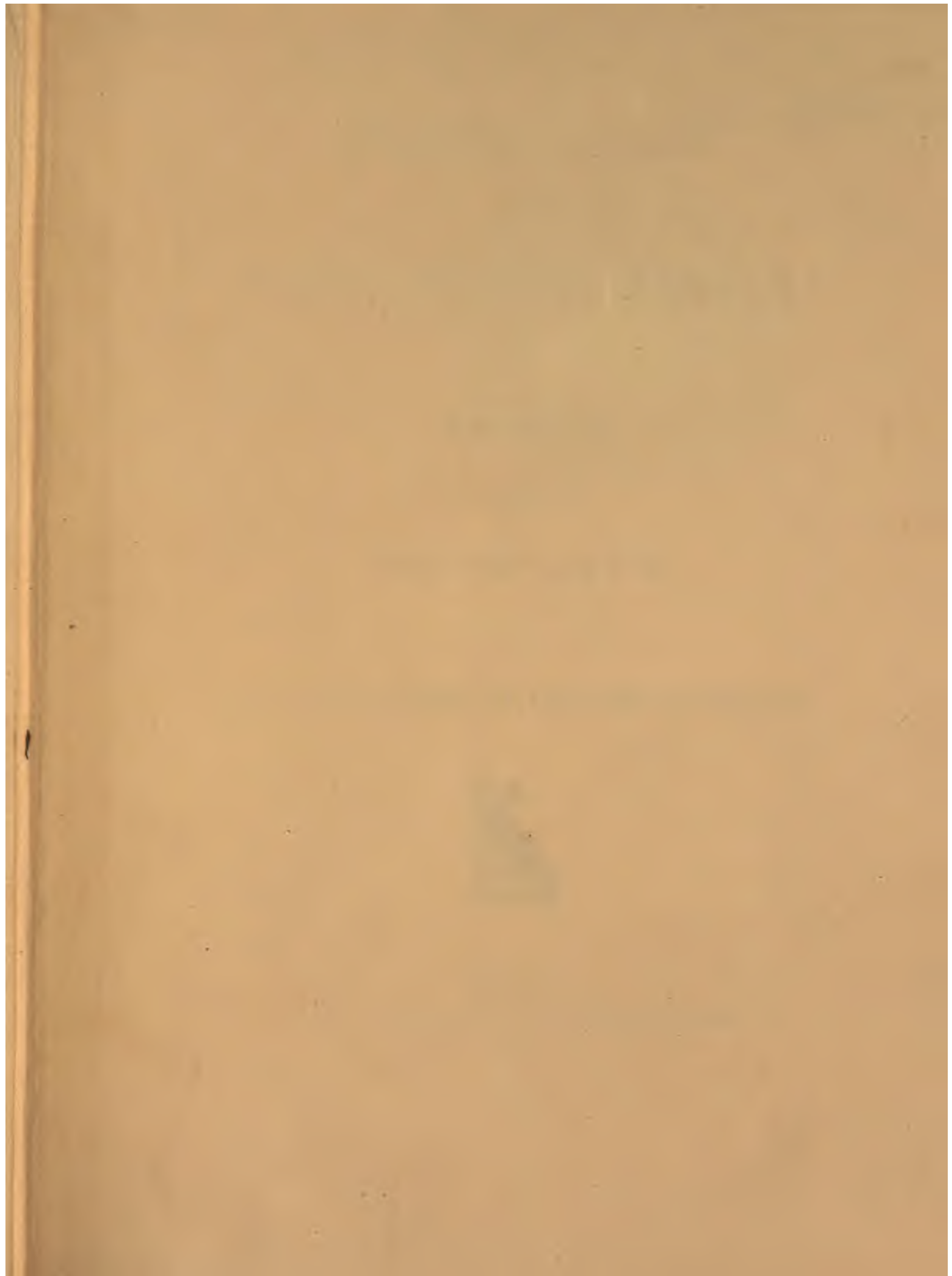
**T**HIS Book belongs to the "Student's  
Library."

It may not be removed from the  
Reading Room without permission  
of the Librarian.

*191163*

*d*

*26*





*For the Radcliffe Library, Oxford  
From the Council of the College.  
Edm. Silliman*

DESCRIPTIVE CATALOGUE

OF THE

FOSSIL ORGANIC REMAINS

OF

PLANTS

CONTAINED IN

THE MUSEUM

OF

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.



LONDON:

PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

1855.



## P R E F A C E.

---

**T**HE specimens of Fossil Plants in the Museum of the Royal College of Surgeons of England amount to 229 ; of these 184 formed part of the Hunterian Collection ; they may be divided into three classes, viz. Woods, Impressions of stems and leaves, and Fruits. The Woods amount to 113, of which 41 were imperfectly described in a Hunterian Manuscript Catalogue ; of the remaining 72 there did not exist any account. The Impressions of stems and leaves amount to 106 ; of these 104 were Hunterian, 50 only having been described. The Fruits are 10 in number, all of which, with a single exception, were described, and the localities of 5 correctly stated.

No account whatever was given of the geological formation in which the specimens of Wood were found, and in only twenty-four instances is any locality noted. In order therefore to render the present Catalogue more complete, every specimen has been cut in three directions, corresponding with the transverse, the radial, and



the tangential sections of the wood ; and the appearances exhibited by each under the microscope, as well as the principal external characters of the specimens, are fully described. By this mode of examination it has been ascertained that the Woods in the Collection of the College belonging to the class *Gymnogens*, in which the *Coniferæ* are included, are by far the most numerous ; out of 113 specimens, 73 belong to this class. The *Exogens* follow next in order ; they are 31 in number ; but of *Endogens* and *Acrogens* there existed only a single example of each class in the Hunterian Collection. In the series of Impressions of leaves and stems the *Acrogens* are well represented.

With regard to the localities from which the Hunterian specimens of Woods have been obtained, 24 only are given ; of these 3 are British, the others having been derived from well-known Continental localities, as in the case of the remains of Vertebrata collected by Hunter. Of the Impressions of Plants the localities of 22 are named ; of these 9 are British, the others being principally from Germany and Switzerland.

The Hunterian and Collegiate specimens were not named ; but this deficiency, as far as practicable, has now been supplied, and the names given are on the authority of John Morris, F.G.S., whose intimate knowledge of these subjects is a sufficient guarantee of their correctness.

Royal College of Surgeons, July 1855.

# TABLE OF CONTENTS.

## PART IV.

---

### FOSSIL PLANTS.

#### Class EXOGENS.

	Page
Dicotyledonous Phanerogamæ . . . . .	1
Impressions of the Leaves of Exogens . . . . .	12
Fossil Fruits, belonging principally to the Class of Exogens . . . . .	13

#### Class GYMNOGENS.

Gymnospermous Phanerogamæ . . . . .	15
Order CONIFERÆ . . . . .	15
Order CYCADEÆ . . . . .	38
Genus <i>Sigillaria</i> . . . . .	38
<i>Stigmaria</i> . . . . .	40
<i>Asterophyllites</i> . . . . .	41
<i>Sphenophyllum</i> . . . . .	41

#### Class ENDOGENS.

Monocotyledonous Phanerogamæ . . . . .	42
--	----

#### Class ACROGENS.

Vascular Cryptogamæ . . . . .	46
Genus <i>Lepidodendron</i> . . . . .	46
<i>Calamites</i> . . . . .	48
FILICES (Ferns) . . . . .	50
Genus <i>Sphenopteris</i> . . . . .	51
<i>Cyclopteris</i> . . . . .	52
<i>Neuropteris</i> . . . . .	52
<i>Odontopteris</i> . . . . .	55
<i>Pecopteris</i> . . . . .	56

**Class THALLOGENS.**

	Page
ALGÆ . . . . .	60
Order FUCACEÆ . . . . .	60
Order CHARACEÆ . . . . .	61
Order DIATOMACEÆ . . . . .	62
Suborder CYMBELLEÆ . . . . .	62
Suborder DESMIDIEÆ . . . . .	75

**VEGETABLE REMAINS OCCURRING IN AGATE AND FLINT.**

**VEGETABLE PRODUCTS.**

Amber and Bitumen . . . . .	80
Coal . . . . .	85

SERIES I.—Coals termed Brown Coals or Lignites, in all of which the woody structure is visible . . . . .	87
SERIES II.—Coals called Cannel or Parrot Coals, in all of which the fracture is more or less conchoidal, and the peculiar tissue characteristic of Coal, visible in every part . . . . .	89
SERIES III.—Coals resembling Cannels, in which the structure of the wood is plainly seen to be Coniferous . . . . .	90
SERIES IV.—Caking Coals, in which the characteristic tissue is nearly obliterated, or only observable in parts . . . . .	91
SERIES V.—Coals, exhibiting remains of plants as a layer of Charcoal, upon one or more surfaces . . . . .	92
SERIES VI.—Coals, in which there is no Bitumen (Anthracites) . . . . .	93
SERIES VII.—Coals, obtained from other strata than those included in the Coal-measures . . . . .	94

# CATALOGUE.

---

---

## FOSSIL ORGANIC REMAINS.

---

### PART IV.

### FOSSIL PLANTS.

---

### Class EXOGENS.

#### DICOTYLEDONOUS PHANEROGAMÆ of *Brongniart*.

THE plants belonging to the class Exogens, formerly called Dicotyledons, are the most completely formed of any of the members of the vegetable kingdom. The term *Exogen*, or "outward grower," is derived from the circumstance of their adding new wood to the outer side of that formed in the previous year: in this respect all the plants of this class differ from those of another large class termed *Endogens*, in which the new wood is first added to the inside of that previously formed. The fossil plants collected by Hunter which are strictly referable to the class *Exogens* amount to twenty-one in number; they principally belong to the families *Juglandææ* and *Acerinææ*. When the transverse sections are examined microscopically, the vessels, with very few exceptions, will be found disposed in a tolerably regular manner throughout the entire breadth of the wood composing each of the annular layers, as in the Walnut, and not principally on the inner side of the several annular layers, as in the Oak and Ash.

1. A portion of a fossil Exogen, being a segment of a branch or trunk about eight inches in diameter; one surface is polished, and shows the annular layers, the mouths of numerous vessels, and the general woody tissue in a clear and well-defined manner; the vessels are rendered more prominent by the light ring surrounding them.

Transverse sections examined microscopically exhibit the medullary rays, the woody fibres, and the openings of the vessels very plainly: in the longitudinal sections, the fibres, the mouths of the medullary rays and the vessels are equally well shown; the latter are of large size, and studded with very minute pores.

Locality unnoted.

*Hunterian.*

2. A portion of a fossil Exogen, the greater part of which is perfectly silicified, whilst a smaller portion of a dark brown colour is as soft as some kinds of recent wood, and when first obtained very readily took fire; three of its surfaces have been polished, and the woody structure is well seen in all. Several specimens of partially petrified wood have been described by Mr. Stokes in the Geol. Trans. vol. v. 2nd Series.

When examined microscopically the structure is best seen in the white parts, where the flinty matter is most transparent; it is better seen in the unsilicified portion than in the black flint in its neighbourhood. The annular layers are on an average about  $\frac{1}{8}$ th of an inch apart; the medullary rays and vessels are both very numerous, and the vessels are all of the porous variety.

From the East Indies.

*Presented by John Quekett.*

3. A portion of a silicified wood of a red colour; it is polished on two surfaces, and in both the annular layers and medullary rays are well seen from the variation in the colour of the specimen.

Transverse and longitudinal sections, examined microscopically, very much resemble those of the Ash and Beech; the woody fibres are of small size, and the spaces between the medullary rays are occupied every here and there with large vessels, which in the longitudinal sections are seen to have their walls covered with pores.

Locality not noted.

*Hunterian.*

4. A small portion of a fossil Exogen, one surface of which is polished, and in this the medullary rays and annular layers are well displayed; it is a portion of a stem or branch four inches in diameter; the medullary rays are of two kinds; one very broad, and occurring at intervals of one-fifth of an inch at the circumference; the others being smaller, and hardly visible to the naked eye.

When examined microscopically, the transverse sections exhibit the openings of very large vessels, which occur in rows following the course of the annular layers; the longitudinal sections show that the woody fibres are of small size, and are crossed by a very large number of medullary rays; but all trace of vessels is completely lost, the cavities in which they existed being filled up with transparent silex, having dark irregular masses of some kind of mineral matter amongst them. The large medullary rays, when divided vertically in the tangential section, exhibit closely-packed cells of oblong figure.

Said to be from Turin.

*Hunterian.*

5. A small fragment of a fossil Exogen of a greyish colour, in which the medullary rays are exceedingly numerous, upwards of thirty being placed within the space of half an inch. The annular layers can be detected with a pocket-lens; and where the medullary rays cross them, there the latter are slightly expanded. The thickest edge of the specimen was that originally covered by the bark, the furrows being formed by the open extremities of the medullary rays.

When examined microscopically the woody fibres will be found of small size, the vessels very numerous, and the surrounding tissue of the porous character.

Locality unrecorded.

*Hunterian.*

6. A small fragment of a water-worn pebble, of a dark brown or black colour, being a portion of a fossil Exogen; one surface has been polished, and shows two distinct structures; the larger corresponding to the wood of the tree, the smaller to the bark.

Examined microscopically, the sections show more plainly than any other specimens in the collection, the structure both of the wood and

bark ; the wood very much resembles that of several of our more common Exogens ; it exhibits the annular layers, the medullary rays and the openings of large vessels, which in the longitudinal sections are found to be of the porous variety ; in the bark may be seen numerous woody fibres and a considerable amount of cellular tissue, all of which are of a rich brown colour.

From the coast of Sussex.

*Presented by John Quekett.*

7. A small irregular fragment of fossil wood of a brown colour : the polished surface, which corresponds with a transverse section of the wood, exhibits very plainly the medullary rays and the mouths of numerous vessels.

Examined microscopically, the sections present the same appearances as those of specimens 16 and 18 ; the woody fibres are of small size, and are crossed by numerous medullary rays, but the vessels are all destroyed.

From the River Derwent, Van Diemen's Land.

*Presented by John Quekett.*

8. A small portion of a fossil Exogen, which has been ground into a semi-oval figure and polished on one surface.

Examined microscopically, transverse sections exhibit broad medullary rays, and the openings of large vessels filled with a transparent crystalline substance, the remainder of the section being occupied with woody fibres of small size and nearly uniform diameter. Longitudinal sections show woody fibres and medullary rays very plainly, but the vessels are all destroyed.

Said to be from Piedmont.

*Hunterian.*

9. A small portion of a fossil Exogen, the tangential surface of which is polished, and the mouths of the medullary rays plainly seen.

Transverse sections, examined microscopically, exhibit woody fibres of small size with the openings of large vessels ; the medullary rays are of considerable breadth : the longitudinal sections in some situations exhibit short dotted woody fibres, but the place of the vessels is occupied by granules of siliceous matter, some of which have an opaque central nucleus, whilst

others exhibit small transparent granules irregularly arranged, with occasional darker matters between them.

Locality unnoted.

*Hunterian.*

10. A portion of fossil wood, two surfaces of which have been polished; the greater part of the structure has been destroyed, and the cavities occupied by transparent and opalescent silex. All the parts that are of a brown colour exhibit the structure very plainly: by a pocket-lens it can be made out that the woody fibres are not numerous, and that the great mass is made up of large vessels.

Examined microscopically, the transverse section shows that the woody fibres are almost all destroyed, and that little remains except the walls of large vessels, whilst the longitudinal ones principally exhibit the remains of large vessels arranged in parallel rows; in one or two spots it is seen that these vessels were of the porous character.

From Antigua.

*Purchased.*

11. A portion of a fossil Exogen of a cubical figure and dark brown colour, exhibiting the woody structure very plainly. The part corresponding to the transverse section shows that the annular layers are about one-eighth of an inch apart, and that the vessels, which are very numerous, are filled in many instances with white crystalline material.

The sections, under microscopical examination, show that the wood was an Exogen having numerous medullary rays, and that the vessels were of large size and of the porous variety, with few traces of the pores remaining.

Locality unnoted.

*Hunterian.*

12. A rough elongated fragment, probably of wood, thus described in the Hunterian Catalogue: "A small branch of wood, petrified with black Hæmatites iron-ore."

The sections are very opaque, and hardly allow the minute structure to be seen, but the general structure appears to be exogenous.

Said to be from Aussig in Bohemia.

*Hunterian.*

13. A portion of a fossil Exogen, in which large furrows have been made, appa-



rently by the action of water ; most of the other parts of the wood have been bored by an animal, probably a *Teredo*. It is of a light brown colour, and its outer surface is sufficiently soft to be scratched by a knife.

Under microscopic examination, the sections show that the wood was very like the Common Lime, *Tilia europæa* ; the medullary rays are very abundant, and many of the woody fibres marked with transverse striæ, and the cells and vessels with small pores.

Locality unrecorded.

*Hunterian.*

14. A portion of fossil wood of a brown colour ; its exterior is of a light grey, from the clay in which it was imbedded ; but the interior is brown, and sufficiently soft to be torn with the nail.

Examined microscopically, the transverse section exhibits very little trace of woody structure ; but the longitudinal one shows that the medullary rays are very abundant, and that ducts or vessels with very minute pores on their walls are of frequent occurrence. Most of the medullary rays are filled with the same brown material as the Bovey and Aller coals.

From the Eocene tertiary formation of Poole Head, Dorset.

*Presented by T. Rupert Jones, Esq.*

15. A small flattened fragment of a fossil Exogen, which has been ground and polished as if for a brooch ; it agrees with specimen No. 22 in being so much impregnated with silex as to have a crystalline fracture.

Very little of the woody structure remains, but still there is enough to show on microscopic examination that the wood was provided with annular layers, with medullary rays, and with vessels of the porous variety.

Locality unrecorded.

*Hunterian.*

16. A small flat portion of a fossil Exogen, of a brownish-black colour. One of the ends corresponding with a transverse section of the wood has been polished ; and by the eye, the medullary rays, the annular layers, and the openings of numerous large vessels can be as plainly seen as in a

corresponding section of oak or ash. The silex with which the wood is impregnated is very transparent.

Examined microscopically, all the sections very much resemble those of the woods above-named ; the medullary rays are very numerous, but all the parts originally occupied by large vessels are filled with transparent silex, in which are groups of highly refracting crystals. There are some slight indications that most of the tissues were of the dotted kind.

Locality unrecorded. *Hunterian.*

17. A small portion of fossil wood, of a jasper-like appearance ; three of its surfaces have been polished, and on them may be seen the annular layers, medullary rays, and the open mouths of numerous vessels.

On microscopic examination, the transverse sections exhibit woody fibres of very small size, forming a sort of matrix for the numerous and irregularly-disposed vessels. The longitudinal sections are made up alternately of bundles of woody fibres and vessels, the latter being composed of the spiral and porous varieties.

Locality unrecorded. *Hunterian.*

18. A small flat portion of fossil wood of a light brown colour streaked with black ; two of its surfaces have been polished, and show distinctly the medullary rays, annular layers, and the openings of large vessels.

The sections when examined microscopically show that the woody fibres are of small size, and that the medullary rays are very numerous ; the vessels are almost wholly destroyed ; but in one or two spots are sufficient indications that they were of the porous kind, the pores themselves being exceedingly small, like those in specimen No. 1.

Locality unrecorded. *Hunterian.*

19. A small piece of a fossil Exogen, being a tangential section of a branch or trunk of a tree about fourteen inches in diameter ; it is of a black colour ; the annular layers and the openings of numerous large vessels may be very distinctly seen with a pocket-lens.

The state of mineralization is such as to present only slight traces of vegetable structure ; but the vessels would tend to show that it was an exogen of the ordinary class. *Hunterian.*

20. Two specimens of highly silicified wood which are remarkable for their whiteness, and for splitting up into ultimate woody fibres; in the larger specimen the outer surface next the bark is preserved, and it shows very plainly the mouths or markings of the medullary rays.

When examined microscopically, the wood is found to be made up of short flattened fibres pointed at both extremities, each exhibiting a central cavity, but no trace of pores; the fibres are about one-third less in breadth than those of specimen No. 121, which belongs to the *Araucariæ*. Large opaque fibres occur in bundles amongst the smaller ones; these are casts of the interior of vessels or ducts, which appear to be of the porous variety.

From Australia.

*Presented by Mr. J. T. Norman.*

21. An elongated portion of wood of a light brown colour, the external surface of which appears to have been polished by the action of water. The annular layers, the medullary rays, and the mouths of numerous vessels can be readily seen with a pocket-lens; the former are very numerous and of considerable breadth.

Examined microscopically, the transverse section shows that both the medullary rays and vessels are full of a transparent crystalline siliceous matter, and the woody fibres of uniform size: the longitudinal section also shows bundles of woody fibres of uniform size, crossed by medullary rays; all trace of vessels has disappeared. The general structure of this wood is like that of the Sycamore.

Locality unrecorded.

*Hunterian.*

22. A thin, square, polished slab of fossil wood, of a dark mottled grey colour and glistening aspect, owing to the abundant deposit of crystalline particles throughout the entire substance of the specimen.

All the sections show that very little of the wood is left, and that remaining is in the form of bundles not more than  $\frac{1}{10}$ th of an inch in diameter, retaining however the character of an Exogen, traces of medullary rays and large vessels being plainly visible. On a superficial examination, the specimen might be mistaken for a fossil Palm.

Locality unrecorded.

*Hunterian.*

23. A small fragment of a fossil Exogen of a light brown colour, showing the annular layers and vessels very plainly; the latter occur in concentric rows and in immediate connexion with the annular layers.

On microscopic examination, the medullary rays are very abundant, and occur as so many broad wavy lines; the vessels are of small size and belong to the porous variety; they have been subjected to great pressure and are difficult to make out.

Locality unnoted.

*Hunterian.*

24. A segment of a fossil Exogen of a light brown colour, in which the medullary rays are very abundant, and very visible to the naked eye; the mouths of vessels are only here and there perceptible.

On microscopic examination, nearly the whole of the woody structure has been destroyed; but still enough remains to show that the specimen was exogenous, and that it was provided with vessels of the porous variety.

Locality unnoted.

*Hunterian.*

25. A large fragment of a fossil Exogen, of a greyish colour, one surface of which has been cut obliquely and polished; the annular layers, medullary rays, and the mouths of numerous vessels are easily recognized; the latter are filled with a black material. Some parts of the specimen are of flinty hardness, others so soft as to be readily broken down with the nail.

Examined microscopically, the transverse section shows that the medullary rays are very numerous, and are occasionally separated by bundles of large vessels filled with black material. In the longitudinal sections the woody fibres occur in parallel rows, and at somewhat regular intervals are seen streaks of globular silex mixed with black material, which formerly filled the vessels now destroyed.

Locality unrecorded.

*Hunterian.*

26. A small specimen of fossil wood, in which a portion of the original exterior is preserved. The woody structure is absent in several parts, its place being occupied by opalescent silex; but when present, the general arrange-

ment of medullary rays and vessels may be easily seen with a pocket-lens.

All the sections under microscopic examination exhibit a regular exogenous structure, the medullary rays being very numerous, and the vessels so large as to occupy a space equal to that included by three of them; these latter resemble those of the Willow and Alder in having porous walls.

Said to be from Chili, S. America.

*Purchased.*

27. A large portion of agatized wood, the outer surface of which is convex, and the inner one concave, with parallel concentric markings between them, appearing as if it had originally formed part of the circumference of some large branch or stem. With the pocket-lens the medullary rays are seen to be very abundant.

Examined microscopically, the sections exhibit appearances very like those of the *Magnolia*; the medullary rays are very abundant, and the vessels, which are provided with large pores, have occasionally terminal markings like those of scalariform tissue.

Locality unrecorded.

*Hunterian.*

28. A small portion of an Exogen of a greyish colour; the vessels, which are very numerous, are easily distinguished by the naked eye, on account of their being filled with an opaque white substance.

Examined microscopically, the transverse section exhibits very narrow medullary rays, between every three of which the vessels occur; these last, as shown by the longitudinal section, are of the minutely porous variety: they are uniformly spread over the extent of each annular layer, and are of considerable size.

From the West Indies.

*Presented by James Hiltou, Esq.*

29. A cylindrical portion of fossil wood of a rich brown colour, two feet ten inches in length and seven in breadth; its outer surface is furrowed, and exhibits several knots or burrs, from which branches have been given off. One surface, corresponding with a transverse section of the wood, has been polished, and the general arrangement of the medullary rays, annular layers and vessels is visible to the naked eye.

When examined microscopically, the sections agree precisely with those of specimen No. 1: the medullary rays are very numerous, and the vessels are principally of the porous variety. In general appearance the wood resembles that of the Walnut.

Locality unrecorded.

*Hunterian.*

30. A small elegant piece of fossil wood of a light brown colour, being part of a branch or stem about two inches in diameter: the remains of the pith may be seen; this is surrounded by twelve concentric zones of wood, which are crossed by numerous medullary rays, and between them are a large number of vessels. Two of its surfaces are polished, and on one may be seen the remains of a branch composed of a single broad zone of wood.

Sections examined microscopically show that the medullary rays are very numerous, and that the vessels, which are all of the porous variety, are of large size, and like those of specimens No. 1 and 28, occur not upon the line indicating each annular layer, as in the Oak, Ash, and Beech, but between them, as in the Walnut.

Locality unrecorded.

*Purchased.*

31. A small piece of a fossil Exogen, being part of an oval stem or branch, two surfaces of which have been polished; the exterior, for the depth of one-eighth of an inch, is white, the remainder light brown mottled with black; the annular layers, medullary rays and openings of vessels are plainly visible to the naked eye.

Sections examined microscopically will be found to resemble very nearly those of the preceding specimen, but the annular layers are narrower, the vessels smaller, and the wood altogether more compact.

Locality unrecorded.

*Purchased.*

*Impressions of the Leaves of Exogens.*

32. A slab of indurated shale marked with an impression of an ovate-oblong leaf, tolerably acute, and having a serrated margin; it belongs to the family *Salicinæ*.  
From the tertiary beds of Æningen. *Hunterian.*
33. A slab of sandstone covered with the impressions of two kinds of leaves, the smaller one belonging to *Cupuliferæ*, probably *Carpinus*, the other *Dombeyopsis grandifolia* (Büttneriaceæ).  
From the brown-coal formation of Germany. *Hunterian.*
34. A small mass of sandstone marked with the impressions of leaves of the family *Cupuliferæ*.  
From the brown-coal formation of Germany. *Hunterian.*
35. Two slabs of calcareous shale marked with an impression of a leaf referable to the genus *Salicites*.  
Locality unrecorded. *Hunterian.*
36. A small slab of indurated marl containing an impression of a leaf of a species of Maple, *Acer tricuspidata*.  
Sternberg, plate 50. fig. 2.  
From the tertiary beds of Æningen. *Hunterian.*
37. A small slab of indurated marl containing the impression of a leaf of *Acer trilobata* (Brongn.).  
Knorr, History of Petrifications, pl. 9. fig. 2.  
From the tertiary beds of Æningen. *Hunterian.*
38. A mass of sandstone marked with the impressions of the leaves of *Dombeyopsis*.  
From the brown-coal formation of Germany. *Hunterian.*
39. A small square slab of indurated marl, presenting an impression of a leaf, referable to *Populus*, and near to *P. crenifolia*, Unger.  
Knorr, tab. 9. fig. 1.  
From the tertiary beds of Æningen. *Hunterian.*

40. A small squared fragment of marl exhibiting an impression of a leaf, probably referable to the order *Rhamneæ*.  
 From the tertiary beds of Ceningen. *Hunterian.*
41. A flat piece of indurated marl, marked with the impression of a leaf, the venation of which is imperfectly apparent; it may probably be referred to the order *Rhamneæ*.  
 From the tertiary beds of Ceningen. *Hunterian.*
42. A small portion of laminated micaceous marl belonging to the brown-coal series or 'papier-kohle schale,' showing the impression of the base of a Dicotyledonous leaf.  
 One of the indentations, like those on the oak-leaf, is shown.  
 From the lignite or brown-coal formation of Bohemia. *Hunterian.*
43. A small piece of marl slate containing an impression of part of a leaf of *Comptonia acutiloba*, Brong. (*Aspleniopteris difformis* of Sternberg).  
 Sternberg, Flora der Vorwelt, pl. 24. fig. 1.  
 From the tertiary beds of Ceningen. *Hunterian.*
44. A split nodule of what appears to be indurated clay or brick-earth stone, showing the impression of the end of a branch with its leaves of a Dicotyledonous plant, like a species of Rose.  
 It appears to be an artificial fossil, probably the result of some experiment made by Hunter to test or exemplify the nature of fossil leaves and fronds, or their impressions in natural stones.  
 No memorandum or note of locality. *Hunterian.*

*Fossil Fruits belonging principally to the Class of Exogens.*

45. A Nut very much resembling that of the Common Hazel, *Corylus avellana*.  
 Locality unrecorded. *Hunterian.*
46. Four Nuts resembling those of the Common Hazel.  
 Locality unrecorded. *Hunterian.*
47. Six Nuts like those of the Common Hazel, recently found beneath a layer



- of red and white clay at a depth of eighteen feet from the surface ; one of them is worm-eaten.  
 From Taunton, Somerset. *Presented by W. S. Gillett, Esq.*
48. A small fruit or seed, described in the Manuscript Catalogue as "a Nut found among the wood, &c. found under the Earth."  
 Locality unrecorded. *Hunterian.*
49. A sandstone cast of a fossil fruit, described in the Manuscript Catalogue as "a small Stone wrought all over with prominent veins : it is like a Nut or Fruit! Bought of D. Costa."  
 Locality unrecorded. *Hunterian.*
50. A calcareous infiltration into the shell of a large *Walnut*, and retaining the form of one half the kernel.  
 Locality unrecorded. *Hunterian.*
51. A fruit of *Nipadites clavatus*, Bowerbank, in which a considerable portion of the pericarp has been destroyed and the nucleus or kernel brought into view ; the pericarp exhibits a series of parallel dark lines : these are the remains of bundles of woody fibres. This specimen is described in the Manuscript Catalogue as "a very fine Pyritical Fruit," but very little pyrites now remains.  
 Bowerbank, Fossil Fruits of the London Clay.  
 From the London clay of the Isle of Sheppey. *Hunterian.*
52. The upper portion of the pericarp of a fossil fruit of *Nipadites ellipticus*, Bowerbank ; it is largely infiltrated with pyrites.  
 From the London Clay of the Isle of Sheppey. *Hunterian.*
53. The upper portion of the pericarp of a smaller species of *Nipadites*, *N. lanceolatus*, Bowerbank ; like the preceding specimen, it is largely impregnated with pyrites.  
 From the London clay of the Isle of Sheppey. *Hunterian.*
54. A fossil fruit of oval figure, largely impregnated with pyrites ; it probably belongs to the genus *Nipadites*, and is described in the Manuscript Catalogue as "a rare specimen."  
 From the London clay of the Isle of Sheppey. *Hunterian.*

## Class GYMNOGENS.

### GYMNOSPERMOUS PHANEROGAMÆ of Brongniart.

The plants belonging to the order *Gymnogens* are characterized by having their seeds naked or wanting a pericarpial covering. They resemble Exogens in their mode of growth; they have annular layers, medullary rays and a central pith, but their wood always exhibits certain discoid markings, known as "bordered pores;" these may occur in a single row, as in *Pinus sylvestris*, or in a double or even a treble row, as in some of the *Araucariæ*; occasionally a spiral fibre exists with the pores, as in the *Yew*. The two most remarkable orders of Gymnogens are the *Coniferæ* and *Cycadeæ*; the former of these, according to Lindley, is connected with Lycopodiaceæ among Acrogens by the extinct genus *Lepidodendron*.

### Order CONIFERÆ.

Gymnogens with a repeatedly branched continuous stem, simple acerose leaves, and females in cones.

55. A mass of fossil wood of a dark brown colour, some parts of which are completely fossilized, whilst others are sufficiently soft to be cut with a knife; it has been bored in every direction by the *Teredo antenautæ*, Sowerby, and the borings are lined with crystalline carbonate of lime.

When examined microscopically, the sections show very clearly that the wood was coniferous, there being a single row of large pores upon most of the fibres; if the softer portions be examined in a little water, the bordered pores will be found detached from the fibres, like those of Preparations I. 61 & 63 in Vol. I. of the Histological Catalogue.

From the London clay near the Thames, at Kingston.

*Presented by W. S. Roots, Esq., F.R.C.S.*

56. A portion of agatized wood, described in the Hunterian Manuscript Catalogue as "A large Jasper-like branch of wood, from Coburg in Saxony."

In some parts the specimen is of opalescent appearance, in others of a rich brown, like jasper.

Thin sections, examined microscopically, show that the specimen is made up of woody fibres, of nearly equal size ; some of them are filled with opaque matter, others are perfectly transparent. The longitudinal sections show, in addition, numerous concentric rings of agate, some of which are no larger in diameter than the fibres themselves, others being equal to three or four fibres. The large bordered pores characteristic of the Coniferæ can only be detected in particular situations, a very common occurrence in all specimens much agatized.

Probably from the Trias.

*Hunterian.*

57. A portion of fossil wood, two-thirds of which have been converted into compact agate ; the rest, although agatized, readily breaking up into minute ultimate fibres.

Thin sections, as well as the ultimate woody fibres, show that the wood was coniferous, and that the bordered pores were in a single row : many of the woody fibres are as transparent as glass, others present a striated appearance.

Said to be from Piedmont. Specimens similarly agatized are very common in Australia. See Nos. 120, 121.

*Hunterian.*

58. A small fragment of a fossil Exogen, parts of which are of a slate colour, the others being black ; two of the surfaces have been polished, and both show the exogenous structure very plainly.

All the sections under the microscope exhibit structure characteristic of the Coniferæ : the bordered pores are of large size, and most of the woody fibres present an appearance of having had a spiral fibre in their interior.

Locality unnoted.

*Hunterian.*

59. A cylindrical portion of fossil wood of a light brown colour, not unlike a bar of rusty iron ; it is marked externally by longitudinal wavy striæ, and the rough granular appearance is produced by the projecting extremities of the medullary rays.

When examined microscopically, the transverse section shows a uni-

form arrangement of thin-walled woody fibres, without any trace of vessels, or annular layers; some of them being filled with transparent silex, others with silex of a rich brown colour. The longitudinal sections exhibit nothing but woody fibres, arranged in parallel rows, and tinged after the same manner. Although no pores are visible, the main characters entirely accord with those of the Coniferæ.

Locality unnoted.

*Hunterian.*

60. A portion of silicified wood, which, on its transverse section, exhibits a variegated tint and disposition of the flinty material; some parts of the external surface are coloured, in purplish streaks. It has been fractured in the transverse direction, and its fissures filled with opaline silex: the woody tissue is well seen in flaky portions of transparent silex.

On microscopic examination, transverse sections clearly show that the wood is coniferous in structure.

From Chemnitz in Saxony.

*Hunterian.*

61. A portion of highly agatized wood, described in the Manuscript Catalogue as "Agate petrified wood of the Linden, with black and white spots, and mingled with woody fibres that can be scraped; one face polished."

On microscopic examination, the structure exhibited by the wood is coniferous, there being in some instances one, in others two rows of bordered pores in each fibre. In the most transparent part of the sections, the agate is in the form of concentric rings. Some of the woody fibres are occupied by a moniliform fungus, like that which has been observed in specimens of recent wood. The concentric rings of agate are best seen in the tangential section.

From the Carpathian Mountains in Hungary.

*Hunterian.*

62. A portion of silicified wood, thus described in the Manuscript Catalogue:—  
"Petrified wood with a fibrous substance that can be scraped, then of brown agate variegated with eyed rings that often occur in agates, from the Province of Liptoria in Hungary:" these last are probably nothing more than fractures.

When examined microscopically, the sections exhibit woody fibres filled with transparent silex in which opaque spherical granules are seen;

these are most abundant towards the circumference. The large glandular pores in the fibres indicate the coniferous character.

From the Province of Liptoria in Hungary. *Hunterian.*

63. A flattened piece of silicified wood, which is of a dark brown colour streaked with yellow, said in the Manuscript Catalogue to be "petrified brown flint with yellowish spots."

On microscopic examination, all the dark parts exhibit the woody structure perfectly, while the lighter are composed of more or less crystallized silex. The structure is coniferous: in many of the woody fibres the siliceous material is tinged with black.

From the Giant's Mountains in Bohemia. *Hunterian.*

64. A portion of extremely dark wood, which at first sight resembles a piece of black marble; it has been polished on two of its surfaces.

Thin transverse sections show that the annular layers of the wood are rather more than a quarter of an inch in breadth, and the longitudinal, that the structure is coniferous. This specimen closely resembles the Craigeith and Lough Neagh trees, and would seem to belong to the Araucarian variety of Coniferæ, although the pores of the fibres can be but imperfectly seen.

From Chemnitz in Saxony. *Hunterian.*

65. An elongated portion of fossil wood coated with crystals of sulphate of lime; some parts are soft like recent wood, others harder and impregnated with pyrites.

On microscopic examination, all the dark portions exhibit a woody structure, and the absence of vessels and presence of pores on many of the fibres are indicative of its coniferous nature.

It is stated in the Manuscript Catalogue to have been obtained "from Shotover Hill in Oxfordshire," and probably occurred in the Kimmeridge clay of that locality. *Hunterian.*

66. Two portions of a fossil Exogen of a brown colour, marked "Petrif Holz Ostind:" both ends of the larger specimen are polished, and the annular layers and medullary rays well shown.

Sections, when examined microscopically, clearly prove that the specimens belong to a Conifer; the medullary rays are very numerous, the woody fibres small and thick-sided, but no pores are visible, the woody fibres being filled with a transparent silex.

From the East Indies.

*Hunterian.*

67. A portion of a fossil Exogen cut into the form of an elongated slab,  $\frac{1}{8}$ th of an inch in thickness, and polished on all its surfaces. The general tint is a yellow- or reddish-brown, streaked with black.

When examined microscopically, the transverse sections clearly show an arrangement of woody fibres precisely like that of coniferous wood; but those made in a longitudinal direction, although showing the woody fibres in some parts very clearly, do not exhibit any trace of pores.

Said to be from Hungary.

*Hunterian.*

68. A portion of wood having a black exterior, as if partly bitumenized, whilst the interior is as soft as recent wood, and can readily be cut with a knife.

When examined microscopically, all the sections show that the wood is coniferous, and that the structure closely resembles that of *Pinus sylvestris*.

Said to be from Coniz, near Neusohl, Lower Hungary.

*Hunterian.*

69. A fragment of opalized wood irregularly broken, the reddish-brown translucent portions having a resinous lustre; one surface, of elongated figure, is cut transversely and polished, exhibiting an irregular undulating concentric arrangement with somewhat sinuous empty spaces: the outer surface is partially decomposed. It is thus described in the Manuscript Catalogue:—"A very large and elegant piece of petrified wood, Linden tree wood, yellowish, converted or petrified into a smooth glossy stone of flinty break, the edges of the fractures somewhat diaphanous, but hardly strikes fire with the steel. It is found in the Marsh grounds (see Knorr's Hist. of Petrifact. pt. 3. p. 16. no. 12); a deep yellow colour like rosin. Two specimens polished, longitudinal and transverse."

Microscopical appearances:—The transverse sections exhibit woody

fibres of large size filled with silex ; the annular layers are on an average one-eighth of an inch in breadth : the tangential and radial sections show bordered pores, like those of coniferous wood, occupying nearly the entire breadth of the fibre. All the woody matter is of a bright yellow colour, but the silex which fills up the spaces left by the disturbed fibres is quite white.

From Boinik, near Neusohl, Lower Hungary.

*Hunterian.*

70. A portion of a fossil Exogen, of a light brown colour, having two of its surfaces polished. It is part of a trunk or branch about six inches in diameter, and shows very plainly four annular layers in the space of an inch.

When examined microscopically, all the sections clearly show that the wood is coniferous.

Locality unnoted.

*Hunterian.*

71. A portion of fossil wood, in which the annular layers are very plainly seen, in consequence of the difference in colour of the mineralizing matter : from twenty-eight to thirty may be counted in an inch of the transverse section.

Sections examined microscopically show that the wood is much impregnated with earthy matter ; but the absence of vessels, and the uniform size of the fibres, would indicate its coniferous character.

From Carlsbad, Austria.

*Hunterian.*

72. A portion of fossil wood of loose structure and light colour ; it is part of a branch or trunk three inches in diameter, and is so soft as to be readily broken down by the nail : the mineralizing matter is calcareous.

When examined microscopically, the sections show that the wood was probably coniferous ; but in consequence of the large quantity of earthy matter, the pores of the fibres cannot be seen.

From the mine of Fensterorth, near Schemnitz, Lower Hungary.

*Hunterian.*

73. A piece of fossil wood of blackish colour and irregular figure, some parts of which are of crystalline structure, whilst others are brown and soft, presenting all the characters of imperfectly fossilized wood.

When examined microscopically, both transverse and longitudinal sections show the wood to be coniferous, and to be nearly allied to that of *Pinus sylvestris*; the fibres exhibit a single row of pores; some fibres are large and transparent, others are full of opaque material.

Locality unnoted.

*Hunterian.*

74. Four flattened irregular pieces of fossil wood, of a reddish-brown colour, like burnt brick. Each exhibits woody fibres and medullary rays, which are visible with a pocket-lens. The two broadest surfaces of the flattest specimen are partially covered with minute sparkling crystals.

When examined microscopically, nothing but woody tissue is to be observed. Many of the fibres exhibit bordered pores, but the chief peculiarity to be noticed is the angular crystallization of the silex within the fibre.

Locality unnoted.

*Hunterian.*

75. A portion of silicified wood, which, like specimens 120, 121, has a tendency to split up into fibres: it is part of a stem, or branch, about two inches in diameter. The general mass is of a white colour, the exterior being tinged with oxide of iron.

All the sections, when examined microscopically, exhibit coniferous structure, and the fibres have one row of bordered pores; some of them are filled with rounded granules of a brown colour, others are perfectly transparent. One of the sections is of a brown colour throughout, and exhibits no granules, which in the others are found in the external portion only.

Locality unnoted.

*Hunterian.*

76. A fragment of a fossil Exogen, composed of contorted and twisted wood, which exhibits traces of borings, and is evidently much water-worn. There are large clefts which have been filled with transparent silex in very small crystals.

When examined microscopically, all the sections clearly show that the wood was coniferous; the annular layers are about  $\frac{1}{8}$  inch in breadth.

Locality unnoted.

*Hunterian.*

77. A cylindrical portion of a fossil Exogen, rather more than an inch in dia-



meter, which has been converted into black flint, except a thin layer at the circumference which is white, and has adherent to it small masses of limestone.

All the sections, when examined microscopically, display a coniferous structure; the woody fibres having one row of bordered pores. The transverse section shows the annular layers very distinctly; twelve of these can be seen with the naked eye.

Locality unnoted.

*Hunterian.*

78. A small portion of fossil wood of a brownish colour streaked with white: is a fragment of a larger piece which has been much water-worn; all the angles on the external surface are smooth and rounded.

When examined microscopically, the transverse section exhibits nothing but thick-walled woody fibres, of circular figure and nearly uniform size; and although the breadth of the specimen exceeds half an inch, there is no indication of annular layers. The longitudinal sections show woody fibres with faint indications of bordered pores, proving the coniferous nature of the wood.

Locality unnoted.

*Hunterian.*

79. A small portion of a fossil Exogen highly agatized; one surface is polished, and this presents an ivory-like appearance; the annular layers have been divided vertically, and are seen as so many parallel striæ. In the Manuscript Catalogue it is described as "petrified wood of chalcedony."

When examined microscopically, all the sections exhibit characters peculiar to the Coniferæ; the woody fibres are of large size, and some of them have as many as two or even three rows of bordered pores; they are filled with very transparent silex, which in certain situations is of the globular form.

From Schemnitz in Hungary.

*Hunterian.*

80. A portion of a fossil Exogen, being part of a branch or stem, about four inches in diameter. The cortical surface is preserved, and on the polished surface, which corresponds with the transverse section, may be seen medullary rays, and very faint traces of annular layers, the former being exceedingly numerous.

Examined microscopically, the sections plainly exhibit a coniferous structure. The principal points to be observed are the small size of the woody fibres, and the great abundance of medullary rays. The transverse section does not exhibit any indication of annular layers.

Locality unrecorded.

*Hunterian.*

81. A fragment of fossil wood of irregular figure; the woody fibres are considerably disarranged, and large cavities are filled up with silex, having a minutely crystalline appearance.

Examined microscopically, all the sections exhibit faint indications of coniferous structure.

From Jubbulpoor, East Indies.

*Hunterian.*

82. A portion of a fossil Exogen of a light slate colour: two of its surfaces have been polished, and numerous circular spots may be observed, which are filled with transparent crystalline and opalescent silex; these were probably holes made by boring animals.

The microscopic appearances presented by all the sections clearly indicate the coniferous character of the wood. The woody fibres exhibit a single row of large bordered pores; many of the former are filled with rounded granules of a rich brown colour, and in some situations the pores themselves are similarly coloured.

From the Lias, Lyme Regis, Dorsetshire.

*Purchased.*

83. A small portion of a fossil wood, of a reddish-brown colour, the external surface of which is smooth and water-worn; two surfaces have been polished, and in both the woody structure can be well seen with a pocket-lens; numerous small knots are visible on the external surface, and may be also plainly seen on the polished inner surface.

The transverse sections exhibit nothing but woody fibres filled with silex of a brown colour, in some instances displaying concentric rings. The longitudinal sections show the same coloured material filling the fibres, but it is chiefly of the globular form, having three or four zones arranged round a central nucleus. Although no pores can be made out, the wood is decidedly coniferous.

Locality unnoted.

*Hunterian.*

84. A thin flat portion of fossil wood, which has been cut and polished as if for a brooch; it is of a yellowish-grey colour with occasional spots of red.

The sections, when examined microscopically, show that the wood was allied to Coniferæ, but, like specimens 80, 87, they show no trace of annular layers: the medullary rays are very abundant, and as many as three, or in some cases four rows of bordered pores occur in one fibre.

Locality unnoted.

*Hunterian.*

85. A portion of highly agatized wood, which exhibits very plainly the annular layers: three of its surfaces are polished, and the silex is so transparent, that, in some parts, the layers can be seen a quarter of an inch beneath the surface, the rest being more opaque. In general character it resembles No. 60.

When examined microscopically, all the sections clearly show that the wood was coniferous: the opaque portions exhibit the woody fibres most plainly, and in the transparent much globular silex occurs.

Locality unnoted.

*Hunterian.*

86. A large portion of fossil wood of cylindrical figure, light brown colour, partly imbedded in a mass of blue lias: certain fissures are found in various parts, which are filled with opaque crystalline carbonate of lime.

When examined microscopically, all the sections show very clearly that the wood was coniferous; most of the woody fibres are filled with a light brown material, and the bordered pores are, in consequence, indistinctly seen.

Locality unnoted.

*Hunterian.*

87. A small flat portion of fossil wood, being part of a trunk or branch about four inches in diameter. One surface has been polished, and the medullary rays can be distinctly seen with a pocket-lens, but no trace of annular layers. The colour of the specimen is of a dark brown, except on the outer margin, where part is of a reddish tinge.

The microscopic appearances presented by the transverse sections agree with those of No. 84, in not showing any trace of annular layers,

and in the uniform size and shape of the woody fibres. The longitudinal sections exhibit nothing but woody fibres, occurring in parallel lines, all being more or less impregnated with brown-coloured silex, but all trace of pores is lost: the absence of vessels and uniform arrangement of woody fibre tend to show that the specimen belonged to the Conifers. The medullary rays are not seen in the radial section.

Locality unnoted.

*Hunterian.*

88. A portion of a silicified fossil wood of a dark brown colour and flattened figure; from the smoothness of its edges, it appears to have been much water-worn: all fractured surfaces have a semicrystalline structure.

When examined microscopically, the sections do not afford very good evidence of the minute structure, but still enough can be made out to prove the coniferous nature of the wood.

From the Alps of Carinthia.

*Hunterian.*

89. A portion of a silicified fossil wood of a light brown colour, the external surface of which is marked by boring animals. The transverse section exhibits very plainly the medullary rays and annular layers; the former are disposed in wavy lines, and the latter measure about  $\frac{1}{3}$ rd of an inch in breadth.

When examined microscopically, all the sections demonstrate the coniferous character of the wood, which approaches very closely to the Scotch fir, *Pinus sylvestris*, both in external characters as well as in its minute structure; one row of large bordered pores occurs in many of the fibres; the medullary rays are very numerous.

Locality unnoted.

*Hunterian.*

90. A small flat piece of fossil wood of a greyish colour, having one surface polished, and exhibiting medullary rays and annular layers very plainly; the former are mostly filled with opaque white matter.

When examined microscopically, the sections exhibit very clearly the coniferous nature of the wood; but most of the woody fibres and medullary rays are filled with calcareous material. There is a single row of pores in some of the fibres.

Locality unnoted.

*Hunterian.*

91. A large portion of a fossil wood, white externally, and black internally: part of the external surface immediately underlying the bark is preserved. The transverse section shows the annular layers, some of which are nearly  $\frac{1}{4}$  of an inch in breadth. The woody structure can be plainly seen in all parts with a pocket-lens.

When examined microscopically, the transverse section shows that the woody fibres are filled up with silex, presenting the appearance known as "fortification agate." In the longitudinal sections only a faint trace of this crystallization can be seen. Both sections exhibit structure characteristic of the Coniferæ.

Locality unnoted.

*Hunterian.*

92. A portion of fossil wood of a brown colour, which, from its smooth exterior, would appear to have been much water-worn.

When examined microscopically, the specimens exhibit a coniferous structure; the pores are somewhat indistinct, but a single row in each fibre may be seen in most parts.

From the Circle of Pilsen in Bohemia.

*Hunterian.*

93. A large portion of fossil wood of a dull brown colour, almost approaching to black. On examination with a pocket-lens, the annular layers will be found to be more than half an inch distant from each other, and the medullary rays exceedingly numerous and well-marked.

Transverse sections examined with the microscope exhibit thick-walled woody fibres of nearly uniform size. The longitudinal sections show that the wood was coniferous, the fibres being provided with a single row of bordered pores, having the central marking oblique as in *Cycas revoluta*.

From Hungary.

*Hunterian.*

94. A portion of fossil wood, being the segment of a trunk or branch about eight inches in diameter. The specimen is mineralized by light-coloured silex, plainly exhibiting to the eye the woody structure, and is traversed transversely by darker lines.

On microscopic examination, the transverse section shows that the

medullary rays are very numerous, and that only two or three rows of woody fibres occur between them. The vertical sections exhibit woody fibres of small size, mostly filled with minute granular matter, but all trace of pores has disappeared. The medullary rays are in many instances filled with orbicular silex. No vessels occur in any part of the three sections, and there is every reason to believe that it was coniferous.

Stated to be from the Principality of Coburg.

*Hunterian.*

95. A portion of wood having a light brown clayey appearance, some parts of which are studded with minute shining crystals of quartz, the outer portion less compact than the interior.

The radial section, when viewed with a power of 100 diameters, exhibits woody fibres of uniform size, which are crossed obliquely by the medullary rays. Most of the fibres are very transparent, others are minutely granular; these last show most plainly that the wood was coniferous, the bordered pores being of large size, and arranged sometimes in a single row, often followed by two double rows.

Locality unrecorded.

*Hunterian.*

96. A transverse section of the trunk of a large tree from the mountain limestone series of Berwickshire, and described by Witham as *Pitus antiqua*. It is of oval figure, eleven and a half inches in the long by seven in the short diameter: about two inches distant from one margin is seen a dark spot three-fourths of an inch in diameter; this is the pith; it is surrounded by a white ring of calcareous material, from which many radii may be traced to the circumference. Some of these radii pass through certain lozenge-shaped portions quite as black as the pith; these are all that remain of the woody structure of the tree, and the medullary rays can be traced through them. All the other parts of the section are made up of nodules or hexagons of calcareous crystalline spar, separated from each other by a black matrix composed of a mixture of earthy and of vegetable matter. Part of the margin is indented, and this is coated with a black substance resembling coal.

All the sections clearly show that this wood belongs to the family of *Araucariæ*, and that there were two or more rows of bordered pores in

each fibre. The black matter surrounding the calcareous crystallizations is mostly made up of decomposed vegetable matter.

Specimens of the Lennel Braes' tree have been accurately described and figured by Witham in his work on "The Internal Structure of Fossil Vegetables," &c.

From Lennel Braes, on the banks of the Tweed, Berwickshire.

*Purchased.*

97. A small flat portion of a fossil tree, of a black colour, intersected with numerous white wavy veins, of crystalline calcareous matter, like those described in the Lennel Braes' specimen. The absence of the annular layers and the large size of the woody fibres would tend to show that this specimen belongs to the species known as *Pinites Withami*.

Examined microscopically, all the sections show that this wood was allied to the Araucariæ, and that it very much resembled some of the trees from Lennel Braes. The woody fibres are of large size, and exhibit many rows of small bordered pores, which occupy the entire breadth of the fibre. In some parts the interior of the pore is destroyed, and the outer wall presents an appearance like that of spiral fibres.

From the quarries of Craighleith, near Edinburgh.

*Purchased.*

98. A portion of fossil wood, having its natural or external surface entire; it is of oval figure on transverse section, and the pith is very excentric; it is thus described in the Manuscript Catalogue:—"A large piece of petrified wood, branch-like, rounded, and thick." The external surface is white, the internal of a light purplish-brown.

Microscopic examination shows that the character is coniferous; the woody fibres being of small size, and the pores in some instances arranged in three parallel rows.

Locality unnoted.

*Hunterian.*

99. A small fragment of fossil wood of a light brown colour; the woody structure is very well seen with a pocket-lens, and it splits very readily in the vertical direction, being so soft as to be easily scratched with the nail.

When examined microscopically, the transverse section shows very

faint indications of annular layers: the greater part of its surface is composed of woody fibres of the same size; but in one spot, which appears to have been the outer part of the annular layer, the thickness of the walls of the fibres is much greater. The longitudinal sections exhibit in some cases a single, in others a double row of large bordered pores placed alternately, a character common to the *Araucariæ*.

From Sandys River, South Africa.

*Presented by T. Rupert Jones, Esq.*

100. A small portion of silicified fossil wood, described in the Manuscript Catalogue as "a cylindric piece of coarse petrified wood with a knot or burr." Some parts of its outer surface are eroded, and a cavity at its smaller end is occupied with a white material like chalk. The larger end has been made smooth, by which the medullary rays and four annular layers are shown, whilst the centre is occupied by what appears to be a pith filled with agglutinated sandy gravel, measuring half an inch in diameter.

When examined microscopically, the transverse section exhibits woody fibres of uniform size, with numerous medullary rays; the longitudinal ones show that most of the fibres were covered with pores like those of the Craigeith and Lennel Braes' tree, and that the central portion corresponding to the pith is made up of a coarse cellular tissue.

Locality unnoted.

*Hunterian.*

101. A thin flat portion of wood of a greyish colour, having two of its edges irregular and tuberculated. The woody fibres and annular layers can be plainly seen with a pocket-lens; the latter are much undulated, and so narrow that upwards of forty occur in an inch.

When examined microscopically, all the sections exhibit coniferous structure: the woody fibres are of large size, and their walls were originally occupied with three rows of bordered pores, traces of which can be seen both in the radial and tangential sections.

Locality unnoted.

*Hunterian.*

102. A portion of fossil wood, the outer surface of which resembles a light clay in colour, the opposite being of a jet-black tint.

When examined microscopically, all the darker portions exhibit the



woody structure very plainly, and frequently in a beautiful manner, but in the white parts it has been nearly destroyed by being impregnated with earthy material. The transverse sections clearly indicate the coniferous character of the wood, and the longitudinal ones display woody fibres of elongated form, some of which present three or even four rows of bordered pores. Sections of wood from the same locality have been already described in the Histological Catalogue, Vol. I.

From Lough Neagh, Ireland.

*Presented by John Quekett.*

103. Another fragment of fossil wood, of much smaller size than the preceding specimen, but wholly composed of the black material. With a pocket-lens the woody structure can be plainly seen on the two surfaces which have been polished.

The transverse sections, examined microscopically, show that the wood has been subjected to great pressure; many of the fibres are little altered, and still exhibit the central cavity, whilst those around have been filled with an orange-coloured deposit, and have their walls much compressed. A similar appearance is often seen in wood converted into jet. The longitudinal sections exhibit in some cases a single row of pores; but the short fibres in the neighbourhood of the medullary rays have two, and these alternate with each other, with a faint trace of a spiral structure also visible. Many of the woody fibres are occupied by irregular masses of dark brown colour, which also will be found to resemble the so-called resinous masses seen in jet.

From Lough Neagh, Ireland, obtained in 1835.

*Purchased.*

104. A fragment of a fossil wood of a dark brown colour, the greater part of which is impregnated with silex; but there is a small piece on the external surface of a lighter brown colour than the rest; it is soft, and readily splits up into ultimate woody fibres.

All the sections clearly show the coniferous nature of the wood, which resembles that of Lough Neagh in every essential particular; in some parts the fibres have been much compressed; the more open ones exhibit the brown masses like resin.

From the Giant's Causeway in Ireland.

*Presented by John Quekett.*

105. A portion of fossil wood, one extremity of which is of a dark brown colour, the other being white, and appearing as if it had been subjected to heat ; the woody structure can be well seen in both parts with a pocket-lens.

Under the microscope the sections clearly show that the wood nearly resembled that from Lough Neagh, as in specimens 102 and 103, there being in each of the fibres, in some cases a single row of pores, in others two alternating rows.

Locality unnoted.

*Hunterian.*

106. A portion of black wood, which is bent very much like the stave of a cask ; the outer convex surface is smooth, the inner rough, as if it had been split off from a large plank. Some parts are of a dull dark brown colour, others being black and lustrous like jet.

The transverse section exhibits woody fibres of small size, which have been so much compressed that only a slight indication of their tubular character can be made out ; they are all of a rich brown colour, and little square masses of brown matter, like resin, may be observed scattered irregularly in many parts of the section. The vertical sections show that the woody fibres have small bordered pores, and many of them exhibit an appearance of spiral fibres in their interior like those of the Yew : these are most evident in the radial section. The resinous material alluded to in the transverse section occurs in considerable abundance in both the vertical sections.

Locality unnoted.

*Hunterian.*

107. A portion of wood, which is very black and heavy, and has a great tendency to split in the longitudinal direction ; it is of oval figure, and appears to have been much compressed.

The transverse section shows that the woody matter is composed of alternate bands of fibres much compressed, and of others exhibiting thick walls of square figure ; the longitudinal ones, when viewed with the naked eye, show two varieties of colour, one of greenish hue, the other of a rich brown, the latter being dependent upon the large quantity of brown resinous material occurring between the fibres and filling up

the cavities of others. The wood itself is coniferous, and the bordered pores are of large size and occur in single rows.

Locality unnoted.

*Hunterian.*

108. A flat portion of wood, which has been almost wholly converted into a black bituminous mass like cannel coal; at one end the black matter is rounded off, just as if it had been melted.

The sections show that the woody matter, although almost wholly converted into a brownish-black mass like bitumen, still exhibits traces of the fibres, the medullary rays and the pores; leading to the belief that the wood was coniferous.

Locality unnoted.

*Hunterian.*

109. A small thick rounded mass of woody matter, known as *Jet*; all its surfaces are black, and more or less rounded and polished.

From the lias clay of Whitby, Yorkshire.

*Purchased.*

110. A thin flat piece of *Jet*, from the same locality as the last-described specimen; one surface has been cut with a saw, and shows concentric wavy markings about  $\frac{1}{4}$  of an inch distant from each other, which appear like the annular layers. The opposite surface presents a rounded protuberance like a knot.

Sections of this specimen have been made in three directions, and when examined microscopically they present the same characters as corresponding sections of coniferous wood. The transverse section exhibits a great number of medullary rays filled with a dark brown material; the woody fibres have been so much compressed, that they exhibit no cavity; they are all of a uniform rich brown tint. The radial section shows faint indications of the medullary rays, and of one row of pores on each of the fibres. The tangential section shows the mouths of the medullary rays very plainly; they occur as so many elongated beaded spots filled with brown material.

From the lias clay of Whitby, Yorkshire.

*Purchased.*

111. A portion of wood of rhombohedral figure, being part of a branch, which has evidently been subjected to great pressure. Two of its surfaces, which correspond to the transverse sections of the wood, are of elongated

oval figure, and exhibit very clearly the annular layers: the specimen has a great tendency to split in this direction, and most of the fragments are of the same rhombohedral figure as the original. The colour of the specimen is light grey, being due to the clay in which it had been imbedded: this can readily be removed with water, and the tint then becomes of a shining black like that of jet.

When examined microscopically, the structure of the wood is not so plainly seen as that of jet. The transverse section shows that the woody fibres have been nearly all compressed into a solid mass. The tangential shows the woody fibres, and mouths of the medullary rays very plainly; but in the radial one, the fibres have been so much compressed, that no trace of pores is visible, although there is every reason to believe that the wood is allied to the Coniferæ.

From the bed of an ancient lake at Naunton Close, Leckhampton, near Cheltenham. *Presented by Albert Way, Esq.*

112. Two other specimens of the same wood, which, like the preceding, are remarkable for their rhombohedral figure. Fragments of wood, agreeing in every particular with these, are to be seen in the Museum of the Geological Society; they were obtained from the Kimmeridge clay.

113. A small flat portion of brown coal, or lignite, both flat surfaces of which exhibit woody structure.

When examined microscopically, the transverse section exhibits a series of wavy lines, produced by a great amount of lateral compression of the woody fibres; in one or two spots the compression has not been so extensive, and the cavity of the fibres can be seen. There is little or no trace of medullary rays, but a series of dark brown masses occur in parallel lines, as if they had once been contained in the medullary cells. Both the tangential and radial sections exhibit woody fibres very plainly, and the former shows that the fibres were provided with bordered pores of considerable size. The brown masses alluded to in the transverse section are very abundant in both the longitudinal ones; they occur in parallel rows, and many of them occupy the cells of the medullary rays.

From Bovey Tracey, Devonshire. *Presented by Miss Mary Brown.*

114. A square fragment of brown coal or lignite ; the whole of the exterior, for about  $\frac{1}{4}$  of an inch in depth, is quite black and brittle, and has the appearance of jet, but the interior is of a dull brown, and is readily cut with a knife.

All the sections agree with those of the Bovey coal, but the woody matter has not been so much compressed, and several spots occur in the tranverse section in which the fibres have been little altered : the brown masses looking very much like resin are very abundant. The bordered pores are very well seen in some of the fibres, and it appears that there is more than a single row of them in each fibre.

From Aller, near Bovey Tracy, Devonshire.

*Presented by Miss Mary Brown.*

115. A portion of highly bitumenized clay containing the remains of wood, which, on microscopic examination, proves to be coniferous. The clay readily takes fire and burns with a bright flame, but giving off much smoke ; a whitish ash is left which exhibits the remains of wood.

From Bovey Tracy, Devonshire.

*Hunterian.*

116. A large irregular fragment of fossil wood of a dark brown colour, some parts of which are covered with a black crystalline material very like coal. A label affixed to the specimen has the following inscription : " Lignum bituminosum, lamellaribus crystallisationibus repletum, ex Aguersibus Collibus."

All the sections clearly show that the wood is coniferous, and that many parts had been subjected to great pressure. One row of large pores will be found on each of the fibres. The tranverse section is very remarkable ; it resembles some of the common kinds of cannel coal.

*Hunterian.*

117. A fragment of fossil wood of a brownish-grey colour ; two of its surfaces have been polished, and both exhibit the woody structure very plainly.

Examined microscopically, all the sections indicate the coniferous nature of the wood. In consequence of a variation in colour of the silicifying material, the radial sections are traversed by a series of brown, parallel,

wavy lines ; the woody fibres exhibit a single row of large oval pores, disposed in a parallel manner.

Said to have been obtained from Chili.

*Purchased.*

118. A cubical fragment of fossil wood of a mottled black and yellow tint, having two polished surfaces, on which traces of woody structure can be seen with the aid of a pocket-lens.

All the sections show that the wood was coniferous, but it is too much impregnated with siliceous matter to exhibit the pores on the woody fibres.

Locality unnoted.

*Presented by John Quekett.*

119. A portion of fossil wood of a brown colour, much impregnated with calcareous material, and in which are large fissures filled with crystalline carbonate of lime ; the woody structure is very perfectly preserved, and the medullary rays are well seen by a pocket-lens.

It splits up very readily into thin fibres, which, on microscopic examination, will be found to exhibit one row of large bordered pores, proving the coniferous nature of the wood.

From the Great Oolite of Lincolnshire.

*Presented by John Morris, F.G.S.*

120. A large curved branch of fossil wood, which, like specimens 20 and 121, from Australia, readily breaks up into ultimate fibres of silky whiteness ; it has been everywhere perforated by boring animals, their tracks being filled with brown transparent silex. The internal portion is firmer, and tinged with oxide of iron.

All the sections clearly show that the wood was coniferous ; but the bordered pores cannot readily be distinguished in the central yellow parts ; in the portion which splits up into ultimate fibres, as many as three rows may sometimes be observed.

Said to be from Bruges.

*Hunterian.*

121. A series of delicate fragments of a fossil wood, which is remarkable for its splitting up into ultimate fibres of silky whiteness, and appearing as so many minute crystals.

Examined microscopically, the fibres will be found to exceed in breadth those of the preceding preparation; three rows of bordered pores being the usual number on each fibre. In some of the fibres the globular form of silex is well seen.

From Van Diemen's Land.

*Presented by John Quekett.*

122. A small fragment of silicified wood, of a light brown colour externally, but internally exhibiting little else than opalescent silex; distinct indications of woody structure may be seen with the naked eye in both parts.

Examined microscopically, some of the fibres are very transparent, and exhibit two rows of bordered pores, occasionally interrupted by a single row; other fibres are remarkable for the beautiful display of concentric rings of globular silex.

From Galveston, Texas.

*Presented by John Quekett.*

123. A small irregular fragment of fossil wood, of a dull brown colour, very soft and much resembling a mass of clay. It is described in the Hunterian Catalogue as "Bitumenified and lapidified wood."

The transverse section agrees with that of many of the other specimens in exhibiting little or no trace of annular layers; the woody fibres are of large size, and are furnished with two rows of bordered pores placed alternately as in the *Araucariæ*.

Locality unrecorded.

*Hunterian.*

124. A large irregular mass of fossil wood, partly surrounded by the matrix in which it was imbedded. It is of a light brown colour, and is easily scraped with a knife; on one edge may be seen a linear series of rounded tubercles, which are probably traces of abortive branches.

Like the preceding specimen, all the sections show that the wood was coniferous; the fibres are of considerable size, and are rendered opaque by a deposit within them of calcareous material.

Locality unrecorded.

*Hunterian.*

125. Several fragments of fossil wood of a dark brown colour, to which the following description was affixed:—"The wood of part of the above fossil, with a piece of the bark reduced to the state of powder, but which

is in the original form of the wood ; the calcareous earth now removed by the muriatic acid, which has rendered it spongy, light, and is easily rubbed to a powder." The bark has best sustained the action of the acid ; it is the only part of which sections can now be made.

Bundles of woody fibres, surrounded by cellular tissue of a rich brown colour, are displayed in the sections, and the powder shows distinctly woody fibres, with occasional traces of bordered pores on their walls, proving the coniferous nature of the wood.

Locality unrecorded.

*Hunterian.*

126. A small portion of a fossil Exogen, the mineralizing matter of which is of a dark brown colour, intersected with numerous red veins like those of jasper, and partially filled with light crystalline silex.

All the sections, more especially the tangential one, examined microscopically, exhibit woody fibres, in which are pores existing with spiral fibres, as in the *Araucariæ* ; the veins are made up of silex coloured red, probably by iron.

Said to be from the Grand Duchy of Coburg.

*Hunterian.*

127. A trunk of a fossil tree, three feet six inches high and one foot ten inches in diameter ; within ten inches of the base it has been split vertically, so that the woody fibres and medullary rays can be well seen with a pocket-lens. The specimen is of a light brown or slate colour, with occasional white streaks, and its exterior is longitudinally furrowed.

On microscopic examination, the structure proves to be coniferous ; the woody fibres are of large size, and have a single row of bordered pores.

Locality unnoted.

*Hunterian.*



### Order CYCADEÆ.

In the Lias, Oolite and Purbeck beds, several species of Cycadeous plants are found ; they occur in the form of conical or subcompressed rounded masses of silica, having their outer surface covered with a series of lozenge-shaped scales ; many of them are closely allied to some of the recent *Zamiæ* ; two species are particularly abundant in the Purbeck formation of the Island of Portland.

128. A stem of a Cycadeous plant, *Cycadeoidea microphylla* ; it is five inches in height and ten in diameter. The outer surface presents a honeycomb structure, produced by the scars to which the petioles were attached ; the entire mass is composed of silica.

From the Purbeck beds of the Isle of Portland.

129. An elongated slab of blue lias limestone, containing an impression of an entire leaf of *Palæozamia Bucklandi*.

From the quarries of Street, Somersetshire.

*Presented by John Quekett.*

130. A smaller slab of blue lias limestone, containing a more perfect impression of a nearly entire leaf of *Palæozamia Bucklandi*.

From the quarries of Street, Somersetshire.

*Presented by John Quekett.*

### Genus *Sigillaria*.

The *Sigillariæ* were tall erect trees, with a regular and cylindrical stem, having no side branches, but becoming dichotomous at the summit ; numerous species are found in the coal-measures of both the Old and New Continents. They are readily distinguished by the longitudinal ribs and furrows, and the scars which are impressed on their outer surface. Specimens of *Sigillaria* occur in different states of preservation ; sometimes the outer cuticle is preserved entire, but more

frequently the impression is derived from the surface of the inner cuticle, and by this means many varied appearances may be formed by the same specimen.

The group was formerly considered to be allied to the Ferns, but it is now referred to the Gymnospermous Dicotyledons of Brongniart, or Gymnogens of Lindley.

131. A large squared slab of coal-shale presenting the impression of part of the stem of *Sigillaria organum*.

Lindley, Fossil Flora, pl. 70.—Sternberg, Flora der Vorwelt, &c. pl. 13.  
From Wigan, in Lancashire. *Hunterian.*

132. A smaller mass of coal-shale marked with an impression of *Sigillaria organum*: like the last specimen, this is an imprint from the external surface of the inner cuticle.

Sternberg, Flora der Vorwelt, pl. 13.  
From Wigan, Lancashire. *Hunterian.*

133. A somewhat curved slab of ironstone, consisting of a cast of the outer part of the stem of *Sigillaria oculata*.

Lindley, Fossil Flora, pl. 59.  
Locality unnoted. *Hunterian.*

134. A small fragment of coal-shale presenting impressions of *Sigillaria oculata*.

Lindley, Fossil Flora, pl. 59.  
Locality unnoted. *Hunterian.*

135. A square slab of coal-shale marked with impressions of *Sigillaria reniformis*; it will be observed that the columns are of much larger size than those in the preceding specimens, and of a decreasing diameter.

Brongniart, Ann. Sc. Nat. iv. pl. 2.—Lindley, Fossil Flora, pl. 57, 71.  
Locality unnoted. *Hunterian.*

136. An irregular flat piece of coal-shale marked with impressions of *Sigillaria reniformis*.

Lindley, Fossil Flora, pl. 57, 71.  
Locality unnoted. *Hunterian.*

137. A thin flat piece of coal-shale, bearing a cast of the outer surface of a *Sigillaria*, probably *S. Murchisoni*, and on the opposite side a reverse impression: the former beautifully displays the disposition and form of the leaf-scars, with the well-marked furrows separating the rows.

Lindley, Fossil Flora, pl. 149.

Locality unnoted.

*Hunterian.*

138. A small thick slab of coal-shale, marked with the impression of *Sigillaria alveolaris*, Brong.

Brongniart, Hist. Vég. Foss. vol. i. pl. 162.

Locality unknown.

*Hunterian.*

#### Genus *Stigmaria*.

A plant extremely abundant in the under-clay of the Coal-measures, and was formerly considered a distinct genus, but is now proved to be the root of *Sigillaria*.

139. A cast in sandstone of a portion of the stem of *Stigmaria ficoides*, compressed on one side, showing the spiral arrangement of the ovate depressed, margined scars, to which appendages were attached. The stem also exhibits traces of longitudinal flexuous furrows.

Lindley, Fossil Flora, pl. 31-36, 166.

Coal-measures. Locality unknown.

*Hunterian.*

140. A slab of bituminous shale, known in commerce as Bog Head Cannel-coal, with a compressed specimen of *Stigmaria ficoides*, the cuticle being converted into a pellicle of coal; the outer striated surface is marked by circular scars, to some of which the rootlets are attached.

Coal-measures of Torbane Hill, near Bathgate, N.B.

*Presented by John Quekett.*

141. Another portion of the same mineral, in which is a smaller specimen of *Stigmaria ficoides*; numerous rootlets are seen on two sides of the plant, but none of the scars so evident in the larger specimen are present in this one.

Coal-measures of Torbane Hill, near Bathgate, N.B.

*Presented by John Quekett.*

Genus *Asterophyllites*.

The plants belonging to the genus *Asterophyllites* are named from their foliage being arranged in the form of a star; they are considered to be allied to the *Cycadeæ*, and their stems were articulated and branched with verticillate leaves arranged perpendicularly to the branches which supported them.

142. A small piece of shale, containing a compressed leaf of *Asterophyllites equisetiformis*, Brongniart.

Brongniart, Prodrôme d'une Histoire, &c. pl. 159.

Locality unrecorded.

*Hunterian.*

143. A flattened piece of shale, containing impressions of *Asterophyllites equisetiformis*.

Brongniart, Prodr. Hist. des Vég. Foss. pl. 159.

Locality unrecorded.

*Hunterian.*

144. A reddish clay-ironstone, with a specimen of *Bechera dubia*, containing a small series of verticillate leaves.

(*Bechera grandis*, Lindley, Fossil Flora, pl. 19, 173.)

Locality unknown.

*Hunterian.*

Genus *Sphenophyllum*.

145. A small piece of coal-shale, with about twelve sets of verticillate leaves of *Sphenophyllum pusillum*.

(*Rotularia pusilla*, Sternberg, Flora der Vorwelt, pl. 26. fig. 4.)

Locality unknown.

*Hunterian.*

## Class ENDOGENS.

### MONOCOTYLEDONOUS PHANEROGAMÆ of Brongniart.

The plants included in the class of *Endogens* are those in which the deposition of new wood in the process of growth always in the first instance takes place towards the interior of the trunk. To this class belong the Palms, Canes, and Orchids, nearly all of which are inhabitants of tropical regions. When the stem is divided transversely, the bundles of woody fibres, which are generally more or less coloured, are few in number in the centre of the stem, but become very abundant, more closely packed, and of a darker colour towards the circumference. Only one specimen of fossil *Endogen* existed in the Hunterian collection.

146. A thin slice of a fossil *Endogen*, about three inches in diameter, the upper surface of which is polished, and the general arrangement of the woody and cellular tissues well shown. The bundles of woody fibres it will be noticed are of light colour, and are scattered irregularly in the centre of the specimen, but towards the circumference they are closely packed and the colour is black. The circumference is formed by closely packed bundles of woody fibres of a yellow colour, forming a zone of  $\frac{1}{8}$ th of an inch in breadth.

Examined microscopically, all the sections show that the specimen is made up of bundles of woody fibres and vessels, surrounded by a cellular tissue; the vessels are all of the ordinary spiral form.

From Saugur in the Deccan, East Indies.

*Purchased.*

147. A portion of the stem of a fossil *Endogen*, which has been divided vertically through the centre, and this surface and the horizontal one polished. The general arrangement of the bundles of woody fibres and vessels is well seen upon both surfaces; the former are of much smaller and the latter of much larger size than those of the preceding specimen;

they are both filled with transparent silex, the greater part of the cellular tissue around them being of a yellow colour.

All the sections under the microscope exhibit bundles of thick-walled woody fibres, and of vessels surrounded by a well-marked cellular tissue. The vessels are mostly of the spiral form, and in many of the larger ones the extremities and the transition from an elongated marking or pore to a regular spiral can be well seen.

From the Island of St. Thomas, West Indies.

*Purchased.*

148. A portion of a fossil Endogen, having one surface, which corresponds with a transverse section of the trunk, polished. The general arrangement of the woody fibres and cellular tissue is very like that of the preceding specimen, but the bundles of the former are of larger size; they are impregnated with transparent silex, and under a pocket-lens appear as holes.

Under the microscope, the sections differ from those of the preceding specimen in having a greater amount of the woody and less of the cellular tissue. The vessels all belong to the spiral form.

From Antigua.

*Purchased.*

149. This specimen has a considerable resemblance to part of a stem of some large cane, as the Bamboo, or Sugar-cane, and it includes a node, the septum of which may be seen at one end, at which part also the exterior is marked with three irregular tubercles. A radiated appearance may be detected in the exposed surface of this septum, the mineralizing matter of the original tissue in spathose carbonate of lime resembling somewhat that disposition of the crossing fibres usually found in this part: it is thus described in the Manuscript Catalogue:—"A cylindrical tube or hollow piece made like a shark's bone, outside rough, rusty, and with three knots or knobs, and is composed of coarse radiated spar; it is only a replacement of sparry particles, for the woody ones, an incrustation formed on the branch of a tree."

When examined microscopically, the transverse sections are seen to be almost wholly composed of transparent crystalline material; but in the

longitudinal one there are certain spots which appear of a yellowish-brown colour to the naked eye, in which cellular and woody structure are apparent, as in the Endogens generally.

Locality unrecorded.

*Hunterian.*

150. A fragment of a large fossil Endogen, exhibiting to the naked eye a series of small openings imbedded in a yellow matrix; all the other parts, which appear to have been cavities, being occupied with opalescent silex; the openings above alluded to are not disposed in any regular order, resembling in character the small vascular bundles found in the large succulent Canes.

When examined microscopically, the sections show that all the yellow matter is composed of cellular tissue, and the openings described are but the extremities of vascular bundles, many of which have besides been filled up, and show themselves in the transverse section as little transparent dots. The vessels are nearly all destroyed, but the woody sheath around them remains.

Locality unrecorded.

*Purchased.*

151. A small portion of a fossil Endogen, in which the bundles of woody fibre and the cellular tissue can be plainly seen with the naked eye; the former are of large size, and at considerable distance from each other.

When examined microscopically, the woody fibres will be found of large size, and many of them thickened with sclerogen deposited in concentric laminae. In the longitudinal section, spiral vessels and porous tissue may be seen in connexion with some of the bundles.

*Purchased.*

152. A portion of a fossil Endogen, one surface of which is rough, as if it had been torn, and the woody fibres project like so many rounded filaments. Two other surfaces have been polished, and both show the bundles of woody fibres which have been divided in three directions, vertically, transversely, and obliquely.

On microscopic examination, the transverse sections exhibit the divided extremities of the woody fibres and vessels, constituting the dark bundles; the former are seen to contain concentric layers of sclerogen, and the

latter are invariably placed at one angle of the bundle. The parenchyma is composed of cellular tissue, having elongated cells; and in different parts may be seen small incipient woody fasciculi, scattered amongst the larger ones. In the longitudinal sections large vessels provided with spiral and reticulated markings may be observed.

From Antigua.

*Purchased.*

153. A portion of fossil wood, which has been almost wholly converted into agate. All the plant-structure remaining is of an opaque yellow colour, and can be readily seen with the naked eye, the matrix in which it is imbedded being transparent.

When examined microscopically, very little structure can be made out in any of the sections; yet still it is probable, from the general arrangement, that the structure is endogenous.

From the East Indies.

*Presented by John Quekett.*



## Class ACROGENS.

## VASCULAR CRYPTOGRAMÆ of Brongniart.

The plants belonging to the class of *Acrogens* are, as the name implies, all such as grow from the summit, and this takes place by the lengthening of the tissues first formed, and not by the addition of new ones, as in the *Exogens* and *Endogens*. To this class belong the *Lycopodiaceæ* or Club Mosses, the *Equisetaceæ* or Horsetails, and the *Filices* or Ferns; they are all abundantly represented in the fossil state by the plants occurring in the Carboniferous series.

Genus *Lepidodendron*.

The plants composing this genus occur in very great abundance in the Coal-measures; they are sometimes found in the form of large trees: the term "scaly tree" is derived from certain triangular markings occurring on the surface of the stem; these are the scars produced by the attachment of the petioles, which are seldom obliterated in the fossil state. The branches and twigs are generally covered with small linear leaves known as *Lepidophylli*. The living representatives of this genus are the *Lycopodiaceæ* or Club Mosses.

154. A large mass of clay-ironstone which has been split, and exhibits a cast and impression of part of a stem of *Lepidodendron aculeatum*; the impressions of many other plants occur on the same slabs; many of these are referable to the leaves of the *Lepidodendron*, and have received the name of *Lepidophylli*.

Sternberg, Flora der Vorwelt, pl. 14.

Locality unrecorded.

*Hunterian.*

155. A portion of a split nodule of clay-ironstone, with a small branch of *Lepidodendron elegans* with numerous *Lepidophylli* on its sides.  
 Brongniart, Prodrôme Hist. Vég. Foss. pl. 85.  
 From the coal-measures of Colebrook Dale. *Hunterian.*
156. A portion of a split nodule of clay-ironstone, with an impression of a small branch of *Lepidodendron elegans* with its surrounding *Lepidophylli*.  
 Brongniart, Prodrôme, pl. 85.  
 Locality unrecorded. *Hunterian.*
157. A mass of sandstone, slightly micaceous, from the millstone grit of the coal-measures, containing a series of well-marked scars of *Lepidodendron obovatum*, Sternb.  
 Sternberg, Flora der Vorwelt, pl. 6, 8.  
 From Flintshire. *Hunterian.*
158. A small square slab of micaceous sandstone (millstone grit), containing a cast of part of the stem of *Lepidodendron obovatum* (Sternb.).  
 Sternberg, Flora der Vorwelt, pl. 6, 8.  
 From the coal-measures. *Hunterian.*
159. A mass of coarse reddish grit, exhibiting casts of the internal sides of the scales of *Lepidodendron rimosum*, Sternb.  
 Sternberg, Flora der Vorwelt, pl. 10.  
 From the coal-measures. Locality unrecorded. *Hunterian.*
160. A mass of clay-ironstone, on one side of which is shown a portion of the lower part of the stem of *Lepidodendron Sternbergii*, and on the other the impressions of *Lepidophylli*, *Calamites*, and leaves of *Neuropteris*.  
 Sternberg, Flora der Vorwelt, pl. 1, 2.  
 From the coal-measures. Locality unrecorded. *Hunterian.*
161. A split slab of coal-shale, exhibiting a cast and impression of *Lepidodendron Sternbergii*.  
 Sternberg, Flora der Vorwelt, pl. 1, 2.  
 From the coal-measures of Yorkshire. *Hunterian.*

162. A large oblong nodule of clay-ironstone, split in halves, and containing an impression of *Lepidodendron Sternbergii*.  
Sternberg, Flora der Vorwelt, pl. 1, 2.  
Locality unrecorded. *Hunterian.*
163. One-half of a split nodule of clay-ironstone, containing an impression of part of the stem of *Lepidodendron Sternbergii*, in which the scars are much larger than in the preceding specimen.  
Sternberg, Flora der Vorwelt, pl. 1, 2.  
Locality unrecorded. *Hunterian.*
164. An elongated nodule of black ironstone, containing an impression of a *Lepidodendron*, filled with crystals of carbonate of lime.  
Locality unrecorded. *Hunterian.*
165. A split nodule of clay-ironstone, containing a cast and an impression of one of the cones or seed-vessels of a species of *Lepidodendron*, which was formerly considered as a distinct plant, and described by the generic name of *Lepidostrobus*, the species in question being probably the *L. variabilis* of Lindley and Hutton.  
Lindley and Hutton, Fossil Flora, pl. 162.  
From Colebrook Dale. *Hunterian.*

#### Genus *Calamites*.

The *Calamites* are found in great abundance in the coal-measures of every country; they occur in the form of stems, sometimes pressed flat, but more frequently retaining their cylindrical figure; they were formerly classed with the *Equisetaceæ*, but by recent investigations have been shown to be entirely distinct, the stems being articulated and regularly striated, and sometimes arborescent. The bark is occasionally found investing the stem in the form of a coaly substance, as shown in specimen No. 166, but more frequently all the organic structure has been destroyed, and nothing remains but a cast of the interior, composed of clay or sand.

166. A portion of the stem of *Calamites pachyderma*, in which some traces of

the bark occur ; these are converted into a black carbonaceous substance resembling coal.

Brongniart, Hist. Vég. Foss. vol. i. pl. 22.

From the coal-measures : locality unknown.

*Hunterian.*

167. A cast of the stem of *Calamites cannaeformis* in reddish and greenish grit ; the longitudinal striæ are well shown.

Brongniart, Hist. Vég. Foss. vol. i. pl. 21.

From the coal-measures : locality undescribed.

*Hunterian.*

168. A mass of sandstone, in which is imbedded a cast of the stem of *Calamites ramosus*.

Brongniart, Hist. Vég. Foss. vol. i. pl. 17.

From Leeswood, Flintshire.

*Hunterian.*

169. A portion of coal-shale, with the impression of a stem of some species of *Calamites*.

Locality unrecorded.

*Hunterian.*

170. A small flat piece of coal-shale, marked with the impression of a *Reed*.

Locality unrecorded.

*Hunterian.*

## FILICES (Ferns).

Ferns are distinguished from all other vegetables by the peculiar division and distribution of the veins of the leaves, and by the regular disposition (in the arborescent species) of the scars left upon the stem at the point from which the petioles have fallen off.

The classification of Fossil Ferns is chiefly founded on the former of these characters, it being impossible to apply to them the system adopted in the arrangement of living genera, founded on the varied disposition of the fructification, which is rarely preserved in the fossil state.

171. A fragment of a fossil Tree Fern, the transverse section of which exhibits to the naked eye a series of oval and circular rings, of a brown colour, the centres of which, as well as the matrix in which they are imbedded, are of a brownish-white. One side has been polished, and on it the woody fibres may be seen occurring in parallel lines.

On microscopical examination, the transverse section shows that the rings are composed of thick-walled woody fibres; within the ring may be observed a bundle of vessels, mostly surrounded by transparent silex. The rest of the section is composed of cellular tissue. The longitudinal sections exhibit long parallel bundles of woody fibres, which are divided on the one side by bundles of scalariform vessels, and on the other by cellular tissue. Certain fissures occur throughout the specimen, and these are occupied by silex, partly transparent and partly of a light brown colour.

Locality unrecorded.

*Hunterian.*

Genus *Sphenopteris*\*.

Leaves bi-tri-pinnatifid ; leaflets contracted at the base, not adherent to the rachis. Lobed ; the lower lobes largest, diverging, somewhat palmate ; veins bipinnate, radiating as it were from the base.

172. A mass of light-coloured shale exhibiting impressions of parts of several fronds of *Sphenopteris elegans* (Brong.).

Brongniart, Hist. Vég. Foss. vol. i. pl. 53.

From the coal-mines of Landshut, Silesia.

*Hunterian.*

173. A small fragment of coal-shale containing the impression of part of a frond of *Sphenopteris elegans*.

Locality unrecorded.

*Hunterian.*

174. Two portions of a split nodule of clay ironstone, containing an impression and a cast of part of a frond of *Sphenopteris Hæninghausi* (Brong.).

Brongniart, Hist. Vég. Foss. vol. i. pl. 52.

Locality unrecorded. Specimens have been obtained from the coal-measures of Newcastle-on-Tyne, as well as from those of France and Germany.

*Hunterian.*

175. A fragment of shale marked with an impression of an undescribed species of *Sphenopteris*.

Locality unrecorded.

*Hunterian.*

176. Two slabs of slaty calcareous stone containing an impression of a branched plant, probably belonging to the genus *Sphenopteris*, and it may be described as *S. patens*. Frond pinnate, pinnæ furcate, alate ; pinnulæ somewhat cuneiform, veins simple, and extending into each of the lobes.

The specimen is described in the Hunterian Catalogue as coming from Switzerland.

*Hunterian.*

\* From σφήν a wedge and πτερίς a fern.

Genus *Cyclopteris* \*.

Leaves simple, entire, and somewhat orbicular; veins numerous, radiating from the base, dichotomous, equal; midrib wanting.

177. A split nodule of clay ironstone of rounded figure containing impressions of *Cyclopteris orbicularis* (var.).

Brongniart, Hist. Vég. Foss. vol. i. pl. 61. figs. 1, 2.

From the coal-measures of Colebrook Dale.

*Hunterian.*

178. One-half of a split nodule of clay ironstone containing an impression of *Cyclopteris oblata*.

Lindley and Hutton, Fossil Flora, vol. iii. pl. 217.

Probably from the same locality as the preceding specimen.

*Hunterian.*

179. One-half of a split nodule of clay ironstone exhibiting an impression of *Cyclopteris oblata*.

Lindley and Hutton, Fossil Flora, vol. iii. pl. 217.

Locality unrecorded, but probably Colebrook Dale, like the preceding specimen.

*Hunterian.*

Genus *Neuropteris* †.

Leaves bipinnate or rarely pinnate; leaflets usually somewhat cordate at the base, neither adhering to each other, nor to the rachis by their whole base, only by the middle portion of it; midrib vanishing at the apex; veins oblique, curved, very fine, dichotomous. Fructification: sori lanceolate, even, covered with an indusium, arising from the veins of the apex of the leaflets, and often placed in the bifurcations.

\* From κύκλος a circle and πτερίς a fern.

† From νεῦρον a nerve and πτερίς a fern.

180. A small fragment of a nodule of clay ironstone marked with an impression of part of a frond of *Neuropteris Loschi* (Brong.).  
Brongniart, Hist. Vég. Foss. vol. i. pl. 72. fig. 1, 73.  
Locality unrecorded. This species occurs in the coal-measures of England, France, Germany and America. *Hunterian.*
181. A small fragment of coal-shale, with an impression of part of a frond of *Neuropteris tenuifolia* (Sternb.).  
Brongniart, Hist. Vég. Foss., vol. i. pl. 72. fig. 3.  
Locality unrecorded. The only locality named by Brongniart for this species is Saarbruck. *Hunterian.*
182. A thick block of triassic limestone marked with the impression of a leaflet of *Neuropteris Gaillardoti* (Brong.).  
Brongniart, Hist. Vég. Foss. vol. i. pl. 74. fig. 3. Stated to be the only species known in this formation.  
Locality unrecorded. *Hunterian.*
183. A small split nodule of clay ironstone marked with an impression and a cast of a leaflet of *Neuropteris flexuosa*.  
Locality unrecorded. *Hunterian.*
184. A portion of a split nodule of clay ironstone exhibiting an impression of part of a leaflet of *Neuropteris flexuosa*, in which the pinnules are remarkable for their flexuous margin.  
Locality unrecorded. *Hunterian.*
185. A split nodule of clay ironstone, with an impression of the greater part of one of the leaflets of *Neuropteris flexuosa*.  
Locality unrecorded. *Hunterian.*
186. One-half of a small nodule of clay ironstone, with the impression of part of a leaflet of *Neuropteris flexuosa*.  
Locality unrecorded. *Hunterian.*



187. Two portions of a split nodule of clay ironstone, with the impression and cast of part of a leaflet of *Neuropteris flexuosa*.  
Locality unrecorded. *Hunterian.*
188. Two portions of a large flattened nodule of clay ironstone, with impressions of three leaflets of *Neuropteris flexuosa*.  
Locality unrecorded. *Hunterian.*
189. A portion of a small split nodule of clay ironstone, with an impression of more than half a leaflet of *Neuropteris flexuosa*.  
Locality unrecorded. *Hunterian.*
190. A nodule of ferrugino-carboniferous stone, split and exposing the upper part of the frond of *Neuropteris flexuosa* (*Osmunda gigantea*, var.  $\beta$ , Sternberg).  
Sternberg, Flore du Monde Primitif, fol. tab. 32. fig. 2.—Transactions of the Geological Society of London, 2nd ser. vol. i. pl. 7. fig. 2 (where the characteristic flexuosity of the stem is better expressed).  
Locality unnoted. The species is found in the carboniferous series at Saarbruck, and in the Lias of Dorsetshire. *Hunterian.*
191. The half of a split nodule of ferrugino-carboniferous stone, with the impression of part of a frond of *Neuropteris flexuosa*.  
Brongniart, Hist. Vég. Foss., pl. 65. figs. 2, 3; pl. 68. fig. 2.  
Locality unnoted; but probably from the same formation as the foregoing. *Hunterian.*
192. A split oval nodule of clay ironstone marked with the cast and an impression of a leaflet of *Neuropteris flexuosa*.  
Locality unnoted. *Hunterian.*
193. A portion of a nodule of clay ironstone marked with an impression of part of a frond of *Neuropteris flexuosa*.  
Locality unnoted. *Hunterian.*

94. The half of a portion of a split nodule of ferrugino-carboniferous stone, with the impression of part of the frond of *Neuropteris heterophylla*.

Brongniart, Classification des Végétaux Fossiles, p. 33. pl. 2. fig. 6 ;  
Hist. des Vég. Foss. pl. 71.

Locality unnoted.

*Hunterian.*

195. Two fragments of a split nodule of clay ironstone, with the impression and cast of part of a frond of *Neuropteris heterophylla*.

Locality unnoted.

*Hunterian.*

196. A small split nodule of clay ironstone, with a cast and impression of a leaflet of *Neuropteris heterophylla*.

Locality unnoted.

*Hunterian.*

#### Genus *Odontopteris* \*.

Leaves bipinnated : leaflets membranous, very thin, adhering by all their base to the rachis : midrib absent or rudimentary : veins equal, simple or forked, very fine, most of them springing from the rachis.

197. A small slab of indurated micaceous shale presenting the impressions of several leaflets of *Odontopteris*, near to *O. Brardii*.

Brongniart, Hist. Vég. Foss. vol. i. pl. 75, 76 : this species seems to have attained a very large size, and was found by Brard in coal-mines in France.

Said to be from Germany.

*Hunterian.*

198. A thin irregular slab of coal-shale, exhibiting an impression of *Odontopteris Schlotheimii*, Brong.

Brongniart, Hist. Vég. Foss. vol. i. pl. 78.

Locality unknown.

*Hunterian.*

\* From *ὀδούς* a tooth and *πτερίς* a fern.

Genus *Pecopteris* \*.

Leaf once, twice, or thrice pinnate: leaflets adhering by their base to the rachis, or occasionally distinct: midrib running quite through the leaflets; veins almost perpendicular to the midrib, simple, or once or twice dichotomous.

199. A slab of coal-shale, marked with the impression of part of a frond of *Pecopteris arborescens*.  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 102, 103.  
 Locality unrecorded. *Hunterian.*
200. A small slab of micaceous slate-shale, with an impression of parts of two fronds of *Pecopteris cyathea*.  
 Brongniart, Hist. Vég. Foss. vol. i. p. 307. pl. 101. fig. 1-4.  
 From Wettin. *Hunterian.*
201. A fragment of coal-shale, showing an impression of part of a frond, probably of a variety of *Pecopteris cyathea*.  
 Locality unrecorded. *Hunterian.*
202. A small fragment of clay ironstone, with an impression of a leaflet of *Pecopteris* (probably) *cyathea*.  
 Locality unrecorded. *Hunterian.*
203. A slab of indurated clay-shale with the impression of part of a frond of *Pecopteris cyathea*; the under surface is uppermost, and traces of fructification are well displayed.  
 Locality unrecorded. *Hunterian.*
204. A portion of a nodule of clay-ironstone, with the impression of part of a frond of *Pecopteris Dournaisii*, probably near the apex of the frond.  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 89.  
 Locality unrecorded. *Hunterian.*

\* From *πέκω* to comb, and *πτερίς* a fern.

205. Two slabs of indurated shale, exhibiting impressions of a large part of a frond of *Pecopteris gigantea*.  
Brongniart, Hist. Vég. Foss. vol. i. pl. 92: this species belongs to the division *Cyathoides* of the genus *Pecopteris*.  
From Germany. *Hunterian.*
206. A thick slab of indurated coal-shale, with an impression of a portion of a large frond of *Pecopteris gigantea*.  
Locality unrecorded. *Hunterian.*
207. A thin slab of indurated clay, entirely covered on one surface with an impression of part of a frond of *Pecopteris gigantea*.  
Locality unrecorded. *Hunterian.*
208. A small square slab of indurated shale, with the impression of several leaflets of a large frond of *Pecopteris gigantea*.  
Locality unrecorded. *Hunterian.*
209. A small slab of indurated shale, exhibiting a very well marked impression of the upper part or apex of a frond of *Pecopteris gigantea*.  
Locality unrecorded. *Hunterian.*
210. A flat slab of indurated shale, containing a well-marked impression of nine leaflets of *Pecopteris gigantea*.  
Locality unrecorded. *Hunterian.*
211. A split nodule of clay ironstone, containing the impressions of two leaflets of *Pecopteris lonchitica* (Sternb.).  
Brongniart, Hist. Vég. Foss. pl. 84.—Lindley and Hutton, Fossil Flora, pl. 153.  
Locality unrecorded. *Hunterian.*
212. One-half of a split nodule of clay ironstone, containing an impression of part of a leaflet of *Pecopteris lonchitica* (Sternb.).  
Locality unrecorded. *Hunterian.*

213. A small block of reddish clay-shale, with a well-marked impression of part of a leaflet of *Pecopteris lonchitica* (Sternb.).  
 Locality unrecorded. *Hunterian.*
214. An irregular fragment of slate-coloured shale, containing an impression of part of a leaflet of *Pecopteris muricata*.  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 95, 97.  
 Locality unrecorded. Specimens have been obtained from the coal-measures of Wettin and Anzin. *Hunterian.*
215. A thin flat slab of shale, containing the impression of part of a frond of *Pecopteris Miltoni* exhibiting traces of fructification.  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 114.  
 From Germany, being found both there and in France. *Hunterian.*
216. A small fragment of micaceous slate-shale, with the impressions of two or three leaflets of *Pecopteris Miltoni*.  
 From Germany. *Hunterian.*
217. Part of a flattened nodule of indurated clay, containing the impression of the upper part of a frond of *Pecopteris Miltoni*.  
 Locality unrecorded. *Hunterian.*
218. A rounded mass of ironstone marked with impressions of *Pecopteris nervosa*?  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 94, 95, by whom three varieties are described, from Germany, France, and England; the last is represented by Lindley and Hutton, Fossil Flora, pl. 94.  
 Locality unrecorded. *Hunterian.*
219. A small slab of shale with the impressions of the upper part of a frond of *Pecopteris nervosa*.  
 Locality unrecorded. *Hunterian.*
220. A small slab of coal-shale marked with the impressions of *Pecopteris polymorpha* (var.).  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 113.  
 Stated to be probably from Silesia. *Hunterian.*

221. Four small masses of indurated shale, with impressions of various parts of fronds of *Pecopteris pteroides*.  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 105.  
 Locality unrecorded. *Hunterian.*
222. A fragment of red shale marked with an impression of part of a frond of *Pecopteris Serlii* (Brong.).  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 85.  
 Locality unrecorded: this species has been found in the coal-mines in the neighbourhood of Bath, and in those of St. Etienne. *Hunterian.*
223. A small mass of indurated shale, with an impression of part of a leaflet of *Pecopteris Sillimanni*.  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 96.  
 Locality unrecorded: specimens have been found in the coal-mines of Zanesville, Ohio. *Hunterian.*
224. A small slab of coal-shale marked with the impression of a frond of *Pecopteris villosa*.  
 Brongniart, Hist. Vég. Foss. vol. i. pl. 104.  
 Locality unrecorded. *Hunterian.*
225. One half of a small nodule of clay ironstone, containing the impression of a leaflet of an undetermined species of *Pecopteris*.  
 Locality unrecorded. *Hunterian.*
226. A small portion of clay ironstone, exhibiting the impression of part of a leaflet of another undetermined species of *Pecopteris*.  
 Locality unrecorded. *Hunterian.*
- 226 A. A large mass of dark shale containing numerous fragments of the pinulæ of *Pecopteris Australis* (Morris).  
 Strzelecki's 'New South Wales.'  
 From a coal-mine on Tasman's Peninsula.  
*Presented by Capt. Sir E. Home, Bart.*

## Class THALLOGENS.

To this class belong the plants known as *Fungi*, *Lichens* and *Algæ*, all of which are remarkable for the extreme simplicity of their structure, whilst at the same time they present innumerable varieties of form, some being of microscopic minuteness, others many yards in length. They are principally composed of cells, and have neither true wood, spiral vessels, nor stomata. No specimen of a fossil Lichen or Fungus exists in the Hunterian or Collegiate Collection, but the Algæ are represented by three specimens of Fuci and by very numerous examples of Diatomaceæ.

### ALGÆ.

The *Algæ* are divided by botanists into five orders, viz. *Fucaceæ*, *Ceramiaceæ*, *Characeæ*, *Confervaceæ* and *Diatomaceæ*; they are characterized by Lindley as "Cellular flowerless plants, nourished through their whole surface by the medium in which they vegetate; living in water or very damp places; propagated by zoospores, coloured spores or tetraspores."

### Order FUCACEÆ.

The plants belonging to this order are those known as Sea-weeds; they are found in the most recent as well as in the most ancient of the fossiliferous strata. Many species occur in the Firestone of Bognor in Sussex; others are frequently seen in the Chalk, and even in the chalk-flints of the same county. The specimens belonging to the Hunterian Collection are all probably from the Continent of Europe.

227. A small angular slab of indurated clay, marked with impressions of *Fucoides intricatus*.

Brongniart, Hist. Vég. Foss. vol. i. pl. 5.

Locality unknown.

Hunterian.

228. A slab of the tertiary slate of Monte Bolca, on which is the impression of the *Delesserites pyrifolia*.

From the eocene tertiary formation of Monte Bolca, Ceningen.

*Hunterian.*

229. A flat piece of marly limestone with the impression of a branched species of *Fucus*.

Locality unrecorded.

*Hunterian.*

### Order CHARACEÆ.

The plants belonging to this order consist of an axis, which may be composed either of a single tube, or of a similar tube around which numerous smaller ones are arranged in parallel lines; from this axis are given off a series of still smaller tubes or branches in the form of whorls. The stems and fruits of many species of *Chara* are found in the fossil state in the freshwater limestones and marls of this country; the latter occur in the form of small rounded masses composed of spirally twisted plates or bands. When first discovered they were considered to be the shells of Mollusks, and were described under the generic name *Gyrogonites* or "twisted stones," a term still in use. All the recent species of *Chara* are generally more or less coated with carbonate of lime.

230. An irregular mass of calcareous material, formed by the axes and branches of a species of *Chara*, many of the filaments of which still retain their tubular character, but their diameter is increased by a thick coating of carbonate of lime.

From the freshwater formation of Ely, Cambridgeshire.

*Presented by John Quekett.*

231. Small masses of freshwater limestone, in which are imbedded many specimens of the seed-vessels of a species of *Chara*; they are of twisted figure and have received the generic name of *Gyrogonites*, the species in question being probably *Gyrogonites medicaginula*.

From Sandown, Isle of Wight.

*Presented by George De Morgan, Esq.*



232. A series of seed-vessels of the same species of *Gyrogonites*, detached from the matrix in which they were imbedded.

From Sandown, Isle of Wight.

*Presented by George De Morgan, Esq.*

### Order DIATOMACEÆ.

The Diatomaceæ are characterized as "angular, fragmentary bodies, brittle, and multiplying by spontaneous fission"; they are divided into three sub-orders, viz. *Cymbelleæ*, *Hydrolineæ* and *Desmidiæ*; the *Cymbelleæ* have a siliceous, the other two a membranous or horny skeleton. The skeletons of the *Cymbelleæ* are composed of organic matter intimately blended with silica, they are indestructible both by heat and acids, and even their most delicate markings are accurately preserved in the fossil state. The *Hydrolineæ*, like the softer Fuci, occur in our clays and slates, whilst numerous specimens of the *Desmidiæ*, although composed of horny material, are found enclosed in nodules of flint, the soft parts of others being preserved in the lower chalk.

#### Sub-Order CYMBELLEÆ.

The *Cymbelleæ* form the most numerous class of the Diatomaceæ, and are so abundant in the fossil state, that strata many feet in thickness and several miles in length, entirely composed of them, occur in various parts of the earth's surface. One of the most remarkable of these is found near the city of Richmond, in Virginia, it is more than twenty miles in length and several feet in depth; at Petersburg in the same State, a sandy marl occurs, which, like that from Richmond, also abounds in these minute vegetable forms. The Polirschiefer, or polishing-slate, of Bilin in Bohemia, forms a series of strata 14 feet in thickness; and the Bergmehl (or fossil farina) of Santa Fiora, in Tuscany, is one mass of these organisms. In the district of Soos, near Eger, in Bohemia, a fine white siliceous earth is found, which when dried appears like pure magnesia, but under the microscope is seen to be mainly composed of the loriceæ of a species of *Campylodiscus*.

In the recent state the *Cymbelleæ* occur in every lake and stream, in every pool or bay, and throughout the ocean in every part of the habitable globe; race has succeeded race, and their skeletons not being destructible, have in the course of ages accumulated so as to form strata of various degrees of thickness.

233. A mass of siliceous marl from the eocene tertiary period, forming part of a stratum upwards of twenty miles in length and 24 feet in thickness. It is almost wholly composed of the fossil remains of Diatomaceæ, which were first described by Professor J. W. Bailey, of West Point Military Academy, on the Hudson. The genera *Coscinodiscus*, *Actinocyclus*, *Gallionella*, *Triceratium*, *Dictyocha*, &c., are all abundant in this deposit.

Professor Bailey, Silliman's American Journal of Science, vol. xlyi.—Ehrenberg, Mikrogeologie, pl. 18.

Discovered by Professor Rogers in the eocene tertiary formation of Richmond, Virginia, North America.

*Presented by Prof. J. W. Bailey.*

234. A small cubical mass of siliceous marl from the same formation as the specimen last described. One of its surfaces is covered with a thin coating of brown-coloured material, probably oxide of iron; the mass itself is very compact, and serves to show the ordinary density of the marl.

From Richmond, Virginia.

*Presented by Dr. Leidy.*

235. A small mass of siliceous marl from the older tertiary formation of Petersburg, Virginia; it occurs interstratified with a shelly deposit, and has been supposed to be a continuation of that found at Richmond, but many of the organisms it contains are very different from those met with in the latter deposit. Among the most interesting of these bodies are those which have been named by Professor Bailey, *Podiscus Rogersii*, *Zygoceros Tuomeyi* and *Z. rhombus*.

Professor Bailey, Silliman's American Journal of Science, vol. xlvi.—Ehrenberg, Mikrogeologie, pl. 18.—Histological Catalogue, vol. i. Pps Aq 36, 46, 47.

From Petersburg, Virginia.

*Presented by Prof. J. W. Bailey.*

236. A small portion of earth, abounding in the remains of Diatomaceæ ; it occurs in the miocene tertiary period, and in addition to the more common forms it contains species of the following genera :—*Actiniscus*, *Gallionella*, *Xanthiopyxis*, *Actinocyclus*, *Coscinodiscus*, and *Dictyocha*.

Ehrenberg, Mikrogeologie, pl. 33. fig. 17.

From Rappanhannock Cliff, Virginia.

*Presented by Prof. J. W. Bailey.*

237. A portion of siliceous marl of a light brown colour, containing many species of the genus *Actinocyclus*, *Actinoptychus*, *Coscinodiscus*, *Dictyocha*, and *Gallionella*.

Ehrenberg, Mikrogeologie, pl. 33. fig. 15.

From the miocene formation of Hollescliff, Virginia.

*Presented by Prof. J. W. Bailey.*

238. A portion of Diatomaceous earth, discovered by Prof. Rogers at Piscataway, not far from the Virginian deposits, and considered by many geologists as an extension of the same stratum. It contains several species of the genera *Podiscus*, *Zygoceros*, *Triceratium*, *Navicula*, and *Dictyocha*.

Bailey, American Journal of Science, vol. xlvi.

From the miocene tertiary formation of Piscataway, Maryland.

*Presented by Prof. J. W. Bailey.*

239. A mass of siliceous earth, abounding in the remains of Diatomaceæ, of the genera *Coscinodiscus*, *Actinocyclus*, and *Gallionella*.

From the harbour of Charleston, U.S. *Presented by John Quekett.*

240. A portion of Diatomaceous earth, of freshwater origin, obtained from an escarpment 700 feet high, in which the strata are described as being horizontal, and the one in question overlaid by several others ; of these, the uppermost is composed of scoriaceous basalt 100 feet thick. It contains many species of the following genera : *Biblarium*, *Biddulphia*, *Coscinodiscus*, *Eunotia*, *Gallionella*, *Pinnularia*, and *Surirella*.

Ehrenberg, Mikrogeologie, pl. 33. fig. 12.

From a river on the eastern flank of Cascade Range of mountains in Oregon.

*Presented by Prof. J. W. Bailey.*

241. A portion of Diatomaceous earth, having the appearance of finely divided chalk ; it was discovered by Prof. Hitchcock in 1838, and has been carefully examined by Ehrenberg, who found it to contain many specimens belonging to the following genera, viz. *Pinnularia*, *Surirella*, *Stauroneis*, *Himantidium*, *Cocconema*, *Gomphonema*, and *Fragillaria*.

Ehrenberg, Mikrogeologie, pl. 3. fig. 3.—American Journal of Science, vol. xlvi.

From the tertiary formations of Spencer, Massachusetts.

*Presented by Prof. J. W. Bailey.*

242. A small portion of Diatomaceous earth, also discovered by Prof. Hitchcock in 1838, and subsequently examined and described by Ehrenberg ; it contains several species of the following genera, viz. *Pinnularia*, *Trachelomonas*, *Himantidium*, *Eunotia*, together with spicula of sponges.

Ehrenberg, Mikrogeologie, pl. 33. fig. 9.—American Journal of Science, vol. xlvi.

From the tertiary deposits of Wrentham, Massachusetts.

*Presented by Prof. J. W. Bailey.*

243. A portion of Diatomaceous earth of chalky whiteness, discovered in 1838 by Dr. Charles T. Jackson. It contains many species of *Pinnularia*, *Surirella*, *Navicula*, and *Eunotia* ; also spicula of various sponges.

Bailey, American Journal of Science, vol. xlvi.

From Blue Hill Pond, Maine.

*Presented by Prof. J. W. Bailey.*

244. A portion of Diatomaceous earth discovered by Prof. Hitchcock in 1838 ; it is of a dark grey colour, and according to Ehrenberg contains no less than nine species of the genus *Eunotia* ; the genera *Navicula*, *Gomphonema*, *Fragillaria*, *Pinnularia* and *Cocconema* are also abundant.

Ehrenberg, Mikrogeologie, pl. 5. fig. 3.—American Journal of Science, vol. xlvi.

From the tertiary formations of Bridgewater, Massachusetts.

*Presented by Prof. J. W. Bailey.*

245. A small portion of Diatomaceous earth, in which are very many species of *Pinnularia*, *Stauroneis* and *Gallionella*.

From the fluviatile deposits of Earleton, county of Colchester, Massachusetts. Presented by Prof. J. W. Bailey.

246. A mass of Diatomaceous earth of a light grey colour, abounding in several species of *Pinnularia* and *Eunotia*, and in specimens of *Cocconema asperum* and *Gallionella distans*.

From West Point, on the Hudson, U.S.

Presented by Prof. J. W. Bailey.

247. A small portion of siliceous marl, almost wholly made up of the remains of Diatomaceæ, and in which the species known as *Gallionella distans* is particularly abundant; in addition to these are specimens of *Stauroneis*, *Tabellaria*, *Eunotia* and *Pinnularia*, with many spicula of sponges.

From Manchester, Massachusetts. Presented by Prof. J. W. Bailey.

248. A mass of siliceous earth almost wholly composed of the remains of Diatomaceæ of peculiar figure; it has been examined by Ehrenberg, who has recognized in it several species of the following genera, viz. *Podosyrtis*, *Flustrella*, *Lithocyclia* and *Eucyrtidium*, all of which belong to his order *Polycystina*.

Ehrenberg, Mikrogeologie, pl. 36.—Histological Catalogue, Pps Aq 49, 50, 51.

From Springfield, Barbadoes. Presented by George Shadbolt, Esq.

249. A portion of Diatomaceous earth from Bermuda, being perhaps the richest and most interesting of any of the earths that have yet been discovered; it has been examined by Ehrenberg, who has given to the larger forms the following generic names, *Chætoceros*, *Craspedodiscus*, *Heliopelta*, and *Stephanogonia*.

Ehrenberg, Mikrogeologie, pl. 33. fig. 18.—Histological Catalogue, vol. i. Pps Aq 10, 22, 33, 34, 39, 40, 41, 44, 45.

From the island of Bermuda. Presented by Prof. J. W. Bailey.

250. Three white masses of siliceous slate, in which the remains of fishes of the ganoid order were imbedded; it is almost wholly composed of the discoid loricae of Diatomaceae, and amongst them are several species of the following genera, viz. *Coscinodiscus*, *Actinocyclus*, *Actinoptychus*, *Dictyocha*, *Gallionella*, *Actiniscus* and *Biddulphia*.

Ehrenberg, Mikrogeologie, pl. 31.

From Oran in Algeria.

*Presented by Mr. J. T. Norman.*

251. A portion of Diatomaceous earth containing specimens of the following genera, viz. *Navicula*, *Pinnularia*, *Stauroptera* and *Eunotia*.

Ehrenberg, Mikrogeologie, pl. 16. fig. 2.

From Lake Lillhaggsjön in Sweden.

*Presented by Prof. Andreas Retzius.*

252. A small portion of infusorial earth termed Reine Kieselerde; it is almost wholly composed of silica occurring in the form of remains of Diatomaceae, amongst which may be observed many fragments and perfect loricae of *Campylodiscus clypeus*; the genera *Pinnularia*, *Navicula*, and *Eunotia* also have their representatives.

Ehrenberg, Mikrogeologie, pl. 10.

From below the peat of Franzenbad in Bohemia.

*Purchased.*

253. A small portion of earth from the same locality as the preceding specimen, in which the loricae of *Pinnularia* are very abundant, those of *Campylodiscus* being few in number.

Ehrenberg, Mikrogeologie, pl. 10.

From below the peat of Franzenbad in Bohemia.

*Presented by John Quekett.*

254. A portion of siliceous earth termed Kieselguhr, almost wholly composed of the remains of Diatomaceae of the genus *Campylodiscus*, the species termed *clypeus* being the most common.

Ehrenberg, Mikrogeologie, pl. 10. fig. 1.—Histological Catalogue, vol. i. Pp Aq 26.

From the tertiary formations of Soos, near Eger, in Bohemia.

*Presented by John Quekett.*

255. A small portion of siliceous earth from the same locality as the preceding ; the greater part of it is made up of large specimens of *Campylodiscus clypeus*, amongst which may be observed several species of *Navicula*, especially *Bohemica*, *sculpta* and *fossilis*.

Ehrenberg, Mikrogeologie, pl. 10. fig. 1.

From Soos, near Eger, in Bohemia. *Presented by John Quekett.*

256. Fragments of siliceous slate known as Polirschiefer or polishing-slate, said to form a series of strata fourteen feet thick : they are entirely made up of the siliceous remains of *Gallionellæ*, with a few examples of the genera *Gomphonema*, *Pinnularia* and *Navicula*.

Ehrenberg, Mikrogeologie, pl. 11.

From the tertiary formations of Bilin, Bohemia.

*Presented by John Quekett.*

257. A thin plate of siliceous marl obtained from the same locality as the preceding specimen : it is of a light brown colour and is almost entirely made up of *Gallionellæ*, the species known as *distans* being the most common.

Ehrenberg, Mikrogeologie, pl. 11.

From the tertiary deposit of Bilin, Bohemia.

*Presented by Prof. Ehrenberg.*

258. A mass of Diatomaceous earth composed principally of fragments of *Synedra*, amongst which may be observed many detached loricae of various species of *Gallionella*, that known as *G. varians* being most common.

From Habichtswald, near Cassel, Germany.

*Purchased.*

259. A small portion of white siliceous material containing several species of *Navicula*, *Pinnularia*, *Eunotia*, and *Gallionella*, but specimens of *Synedra* of the species termed *ulna* are especially abundant.

From Gossa, in Bohemia.

*Purchased.*

260. A mass of white siliceous material having the lightness and general appear-

ance of magnesia or flour; like the preceding specimen, it abounds in *Synedra ulna*, the other genera above mentioned being also present.

Said to be from Germany.

*Presented by John Quekett.*

261. A small portion of siliceous earth entirely made up of the remains of various species of Diatomaceæ, of the genera *Synedra*, *Cocconema* and *Eunotia*; *Synedra acuta*, *Gallionella varians* and *distans* constitute fully one-third of the mass.

Ehrenberg, *Mikrogeologie*, pl. 13. fig. 1.

From Oberohe, near Ebsdorf, Hanover.

*Purchased.*

262. A small mass of siliceous earth from the same locality as the preceding specimen, in which the various species of Diatomaceæ are very little broken; specimens of *Synedra acuta* and *ulna*, and joints of *Gallionella distans* are very abundant. The remainder is made up of *Eunotiæ*, *Naviculae* and *Cocconemæ*. The large *Gallionella*, *G. varians*, is also present.

Ehrenberg, *Mikrogeologie*, pl. 13. fig. 1.

From a stratum 28 feet thick, at Oberohe.

*Purchased.*

263. A portion of Diatomaceous earth abounding in the genera *Synedra*, *Pinnularia*, *Eunotia*, *Cocconema*, and *Fragillaria*, those of the genus *Synedra* being the most remarkable.

Ehrenberg, *Mikrogeologie*, pl. 6. fig. 1.

From Santa Fiora, Tuscany.

*Presented by Mr. J. T. Norman.*

264. A small portion of siliceous earth termed Bergmehl or mountain meal, having the general appearance of flour, which in times of great scarcity is said to be mixed with the ground bark of trees and used as food; it is almost wholly made up of the remains of Diatomaceæ, in which the genera *Pinnularia* and *Eunotia* are particularly abundant.

Ehrenberg, *Mikrogeologie*, pl. 16.

From the tertiary deposits of Lapland.

*Presented by John Quekett.*



265. A mass of siliceous earth of a dark grey colour, forming part of a stratum 18 feet thick, underlying the city of Berlin; it is principally composed of Diatomaceæ of the genera *Pinnularia*, *Surirella*, *Eunotia*, and *Gallionella*. This stratum has been described by Ehrenberg, who discovered that most of the Diatomaceæ were not only of the same species as those still living in the neighbourhood of Berlin, but were themselves alive and propagating.

Ehrenberg, Mikrogeologie, pl. 14. Monatsberichte der Berliner Akademie der Wissenschaften, 1841.

From beneath the city of Berlin.

*Presented by John Quekett.*

266. A mass of siliceous earth of a lighter colour than the preceding specimen, forming part of a stratum still underlying the city of Berlin, but found at a much greater depth; it consists principally of silica in the form of small flattened plates, amongst which may be discovered the remains of several species of Diatomaceæ belonging to the genera *Gallionella*, *Eunotia*, and *Pinnularia*, but they are not so abundant as in the specimen from the upper stratum.

Ehrenberg, Mikrogeologie, pl. 14.

From beneath the city of Berlin.

*Presented by John Quekett.*

267. A mass of siliceous earth of a still lighter colour, and forming part of a deeper stratum than the preceding specimen; it is almost wholly made up of the remains of Diatomaceæ, amongst which may be observed many species of the following genera, viz. *Pinnularia*, *Gallionella*, *Eunotia*, *Synedra*, and *Cocconema*. In addition to the vegetable remains, the spicula of several species of sponges occur in considerable abundance in the specimens from all three localities.

Ehrenberg, Mikrogeologie, pl. 14.

From beneath the city of Berlin.

*Presented by John Quekett.*

268. A small portion of siliceous earth termed "artificial silica from salt water;" it is almost wholly composed of Diatomaceæ of the genus *Achnanthes*, mixed with numerous fragments of the joints of *Gallionella distans*.

Locality unrecorded.

*Presented by John Quekett.*

269. Another portion of siliceous earth, also termed "artificial silica," which is almost entirely composed of a species of Diatome, termed *Achnanthes brevipes*, the remainder being principally made up of two species of *Gallionella*.

Locality unrecorded. *Presented by John Quekett.*

270. A small portion of siliceous material of a pink colour, which has been subjected to a red heat; it is principally composed of Diatomaceæ of the genera *Gallionella* and *Achnanthes*, which are mixed up with the spicula of various species of sponges; the colouring matter is in the form of small irregular masses, and is probably composed of oxide of iron.

From Franzenbad in Bohemia. *Presented by John Quekett.*

271. A small portion of siliceous marl of a light colour, having the general aspect and lightness of magnesia, and of fibrous structure, as though it were made up of spicula. It was discovered by Mr. Walter Mantell on the banks of a large brackish water lake, where it formed an extensive bed. It is almost wholly composed of *Gallionellæ*, of which there are three different species, and all remarkable for the continuity of the frustules, very few being found in a detached condition. A few specimens of *Synedræ* and *Fragillariæ* may be occasionally observed.

From the banks of the Lake Waihora, in the Middle Island of New Zealand. *Presented by John Quekett.*

272. A very small portion of siliceous earth, also discovered by Mr. Walter Mantell in New Zealand. It occurred in the form of hillocks of sand of considerable extent, which on a subsequent visit to the spot were found to have been dispersed by violent currents of air; it is almost entirely composed of Diatomaceæ, and of spicula of sponges. The genera *Cocconema*, *Pinnularia*, *Navicula*, *Eunotia*, *Fragillaria*, and *Surirella* have numerous representatives. A species of *Stauroneis*, somewhat resembling *S. Phænicenteron* of Ehrenberg, is the most striking feature of this deposit.

Mantell, Geological Journal, vol. vi. pl. 29.—Histological Catalogue, vol. i. Pp Aq 20.

From New Plymouth, New Zealand. *Presented by John Quekett.*

273. A series of thin flakes of dried siliceous mud of a grey colour, very light and having a fibrous texture. With the exception of some brown patches of vegetable remains, it is wholly made up of siliceous loriceæ of Diatomaceæ, amongst which the genera *Synedra* and *Eunotia* are most abundant, and to the former the fibrous structure is in a great measure due. Some of the flaky portions of the deposit readily break up into a fine powder, whilst others are kept together in small masses; the powder is composed principally of the remains of *Fragillariæ*, *Gallionellæ*, and *Naviculæ*, whilst the masses are chiefly made up of *Synedræ*, *Cocconemæ*, and *Eunotiæ*.

From the tertiary deposits of Kirkby Mucloe, Leicestershire.

*Presented by the Rev. G. S. Isbell.*

274. A mass of white siliceous material having the general aspect and feel of magnesia, discovered by Dr. Drummond at the base of the Mourne Mountains in Ireland. It is almost wholly composed of the remains of Diatomaceæ, and Ehrenberg has described and named nearly one hundred species, belonging principally to the genera *Pinnularia*, *Gallionella*, *Stauroneis*, *Navicula*, *Surirella*, *Eunotia*, *Himantidium*, and *Synedra*. A species of *Campylodiscus* also occurs, which he has named *C. Hibernicus*.

Ehrenberg, *Mikrogeologie*, pl. 15 A. —*Mag. of Nat. Hist.*, New Series, vol. iii. p. 353.

From the tertiary deposits at the base of the Mourne Mountains in the County of Down, Ireland.

*Presented by John Quekett.*

275. A small portion of siliceous earth, which from being extensively used in the polishing of plate, is known in Ireland as Lord Roden's plate-powder. It is almost wholly made up of the remains of Diatomaceæ, with an occasional mixture of the spicula of certain freshwater sponges. The genera *Navicula*, *Pinnularia*, *Surirella*, and *Eunotia* are well represented; but the principal part of the mass is composed of joints of *Gallionellæ* of the species described by Ehrenberg as *granulata* and *distans*, amongst which, two larger species occur in the form of flattened discs with a radiated structure; these have been named *biseriata* and *punctigera* by Ehrenberg.

Ehrenberg, Mikrogeologie, pl. 15 B. Histological Catalogue, vol. i. Pp Aq 12.

From the banks of the river Upper Bann in the County of Down, Ireland. *Presented by John Quekett.*

276. A small portion of siliceous earth of a delicate cream colour, very rich in the remains of Diatomaceæ of the genera *Navicula*, *Epithemia*, *Surirella*, *Synedra*, *Cocconema*, *Gomphonema*, and *Stauroneis*. It is found on the shores of Lough Mourne, and is a deposit of recent date, the greater number of the species contained in it being still found alive in the waters of the lake. It has been described by the Rev. William Smith, who has discovered in it upwards of forty different species of Diatomaceæ.

Rev. W. Smith, Annals of Natural History, vol. v. p. 121. Histological Catalogue, vol. i. Pp Aq 52.

From the shores of Lough Mourne, Co. Antrim, Ireland.

*Presented by the Rev. William Smith.*

277. A portion of siliceous earth of a yellow colour, almost wholly composed of the remains of Diatomaceæ, amongst which may be discovered several species of the genera *Pinnularia*, *Navicula*, *Eunotia*, *Gomphonema*, *Surirella*, *Fragillaria*, *Synedra*, *Gallionella*, and *Tabellaria*, but one of the most common species is *Surirella splendida*.

Histological Catalogue, vol. i. Pp Aq 18.

From the tertiary deposits of Dolgelly, North Wales.

*Presented by John Quekett.*

278. A mass of siliceous marl of a light grey colour, almost entirely composed of the remains of Diatomaceæ, amongst which may be particularly recognized several species of *Surirella*, *Fragillaria*, *Eunotia*, *Gallionella*, *Pinnularia*, *Synedra*, and *Cocconeis*. Numerous minute portions of vegetable structure are also present, most of which are covered with the frustules of *Fragillaria pectinalis*.

From the tertiary formations of the Isle of Man.

*Presented by John Quekett.*

279. A portion of siliceous earth discovered in 1852 by the Duke of Argyll ; it constitutes a bed resembling marl in appearance, and lies in a rough piece of ground between a freshwater lake and the sea ; it rests upon gravel, and was probably once the bed of an ancient lake. There are two kinds of this marl, one perfectly white like chalk, the other of a pale fawn-colour. It has been carefully examined by Prof. William Gregory, who has recognized in it nearly a hundred species of Diatomaceæ, most of which are inhabitants of fresh water. The genus *Pinnularia* is represented by fourteen species, *Navicula* six species ; the other genera, almost equally rich in species, are *Cymbella* and *Himantidium*.

Gregory, Transactions of the Microscopical Society, New Series, vol. i. p. 92, vol. ii. p. 24.

From Knock, near Aros, Isle of Mull.

*Presented by Prof. William Gregory.*

## Sub-Order DESMIDIEÆ.

THE only examples of *Desmidiæ* occurring in the fossil state are the peculiar bodies found in flint, termed *Xanthidia* by Ehrenberg, from their resemblance to certain recent plants bearing this name. They are of microscopic minuteness, rarely exceeding  $\frac{1}{250}$ th of an inch in diameter, and consist of a central portion or body, from which a variable number of arms radiate, both being hollow, and apparently made up of a thin transparent horny material. *Xanthidia* were first discovered in flint by the Rev. J. B. Reade, in 1838; eleven species were subsequently described in vol. i. of the Transactions of the Microscopical Society of London, by Henry Hopley White, Esq. In 1845 they were discovered in the lower chalk, between Folkestone and Dover, by Mr. Deane, of Clapham, and in the same year were detected in the mud of the Thames, at Greenhithe, in Kent, by Mr. J. T. Norman; in both these instances they could be isolated from the matrix in which they were imbedded, by treating them with acid. Although by modern investigation it has been shown that the resemblance of these organisms to recent *Xanthidia* is that of external form only, and that they probably belong to a higher class of organized beings, yet, as their true nature still remains undetermined, it has been thought proper to retain them in the position in which they were originally placed, on the authority of Ehrenberg. The late Dr. Mantell, in order to avoid the retention of a name previously given to a genus of recent plants, has substituted that of *Spiniferites* for *Xanthidium*, a term which simply expresses the general aspect of these bodies without denoting their affinities.

280. A small portion of mud, taken from the River Thames at Greenhithe, which, after being washed and boiled in strong nitric and sulphuric acids, has been mounted in Canada balsam. The principal part of the mass is composed of particles of silica, with which are mixed acerate spicula of sponges and the loriceæ of Diatomaceæ. In each of those parts sur-

rounded by a painted line, specimens of *Xanthidia* may be observed; one of these resembles *X. crassipes* of Mr. White, it is of a brown colour, and is evidently composed of some material having the flexibility and other characters of horn.

Wilkinson, Transactions of the Microscopical Society of London, vol. ii. p. 89.

From the mud of the Thames at Greenhithe, Kent.

*Presented by Mr. J. T. Norman.*

281. Another portion of the same mud, in which two specimens of *Xanthidia* may be observed; one like *X. spinosum*, the other resembling *X. tubiferum recurvatum* of Mr. White.

Wilkinson, Transactions of the Microscopical Society of London, vol. ii. p. 89.

*Presented by Mr. J. T. Norman.*

282. A portion of the sediment of a small fragment of grey chalk, after having been treated with hydrochloric acid: in addition to the remains of *Rotalia* and of other minute animal organisms, it contains several species of *Xanthidia* like those found in flints, amongst which Mr. Deane has recognized *X. spinosum*, *ramosum*, *tubiferum simplex*, *tubiferum recurvum*, and *malleoferum*. The specimens, when submitted to pressure in water between two pieces of glass, were found to be flaccid, and the arms or spines perfectly closed at their extremities.

Deane, Transactions of the Microscopical Society of London, vol. ii. p. 77.

From the grey chalk found on the beach between Folkestone and Dover.

*Presented by Henry Deane, Esq.*

283. A thin section of a very white and transparent chalk-flint, in which may be seen ten specimens of *Xanthidia*, of the species termed *spinosum*, *ramosum*, *tubiferum simplex*, and *tubiferum complex*, all of which will be found within the small circles marked with the diamond. Several rounded masses of a white opaque substance occur in this section, which, on

examination, exhibit a structure characteristic of the shelly part of an Echinoderm.

From a pebble found on the beach at Brighton.

*Presented by Mr. J. T. Norman.*

284. A thin section of a flint of a light brown colour, in which eight specimens of *Xanthidia* may be observed; the species termed *spinosum* and *tubiferum simplex* being the most common: there are also the remains of numerous *Rotaliæ*.

From the white chalk of Gravesend.

*Purchased.*

285. A thin section of a white flint containing four specimens of *Xanthidia*, one of which is of the species termed *X. ramosum*, and others are allied to *X. furcatum*; one of these last is of oval figure, and a portion of its margin is considerably indented. Another point of considerable interest in this specimen is the presence of several *Rotaliæ*, and of spicula of various species of sponges.

From the white chalk of Dover.

*Purchased.*

286. A thin section of flint of a light brown colour, containing eleven specimens of *Xanthidia*, principally of the species known as *X. spinosum*, *tubiferum simplex*, and *ramosum*: in addition to these, several tri-radiate spicula of sponges may be observed, some of them sufficiently large to be visible to the naked eye.

From a gravel flint picked up in the High Street of Islington.

*Presented by Mr. J. T. Norman.*



## VEGETABLE REMAINS OCCURRING IN AGATE AND FLINT.

MASSES of flint and pebbles are found in various parts of the globe, which contain traces of vegetable remains, some occurring as fragments of wood or of cellular tissue, others in the form of confervæ; in similar pebbles the fibres and spicula of Sponges are very abundant. The pebbles of Oberstein in Germany are richest in these productions, and it is from thence that the London market is chiefly supplied with slices cut and polished for brooches and other ornaments, which are known as Moss Agates. Those containing sponges and confervæ, when of a green colour, are distinguished by the name of Green Jaspers. Other peculiar markings occur in Agates which at first sight resemble confervæ, but on careful examination will be found to be dendritic crystallizations: this kind of agate is principally brought from the East, and is known in commerce as Mocha stone. The vegetable nature of many of these markings was maintained by Daubenton and Dr. M'Culloch; more recently M. Brongniart has investigated this subject, and considers the greater number of the markings to be crystallizations; Mr. Bowerbank, on the contrary, is of opinion that most of them are to be attributed to the remains of sponges, those of confervæ being comparatively rare.

287. A portion of a nodule of flint of a grey colour, which has been split, and exhibits a fragment of wood about two inches in length and one in breadth, of a brown colour, showing a coarse fibrous structure to the naked eye: chippings examined microscopically prove very clearly that the wood was coniferous and that the split surface corresponded with the tangential section of the wood, the mouths of the medullary rays being very apparent and occupied by transparent silica.

From the chalk of Gravesend.

*Purchased.*

288. A slice of flint of a light brown colour, in which is imbedded a minute fragment of woody tissue having portions of two spiral vessels attached to it, the pointed extremities of which are well shown.

From a flint picked up at Brighton.

*Purchased.*

289. A slice of transparent Agate, in which are imbedded numerous filaments of a confervoid plant of a rich green colour, mixed with other larger filaments having a dark line running through the centre; these last are considered to be the remains of the horny skeleton of a Sponge. These Agates are known in commerce as Green Jaspers.

Bowerbank, Annals and Magazine of Natural History, Sept. 1842.

From Oberstein in Germany.

*Purchased.*

290. A small slice of a transparent Agate of an oval figure, known as a *Mocha stone*, exhibiting a black moss-like structure, which on examination is seen to be due to the dendritic crystallization probably of iron or manganese.

From the East Indies.

*Purchased.*

291. A slice of a transparent Agate, known as a Moss Agate, from the presence of numerous branching filaments of a brown colour; these are the remains of the horny skeleton of a Sponge. In one part of the specimen, large spicula having tri-radiate extremities may be observed; these also belong to Sponges.

From Oberstein in Germany.

*Purchased.*

This and the two preceding specimens have been introduced to show the difference between organized and non-organized structures occurring in Agates.

## VEGETABLE PRODUCTS.

### AMBER AND BITUMEN.

AMBER is a fossil resinous material, occurring in beds of lignite in various parts of Europe, and in none more abundantly than on the south coast of the Baltic, between Königsberg and Memel: it is supposed to be the production of an extinct species of Pine, *Pinus succinifer*, and frequently contains insects, spiders, small crustaceans, together with leaves and fragments of vegetable tissue. According to Dr. Mantell, upwards of 800 kinds of insects have been observed: most of them belong to species, and even to genera, distinct from any now known, others are nearly related to indigenous species, and some are identical with existing forms now inhabiting more southern latitudes. The remains of 48 species of trees and shrubs have also been discovered imbedded in this material, amongst which may be enumerated the Cypress, Yew, Juniper, Beech, Poplar, and Oak.

Other resinous substances found in a fossil state have been classified as Amber, and even specimens of Copal and Animè containing insects are often sold as Amber; but these substances can always be distinguished from true Amber by the insects being of indigenous species. In digging a tunnel through Highgate Hill in 1811, a fossil resinous substance was discovered in the form of rounded concretions, which proved to be a resin allied to Amber. Bitumen is an inspissated mineral oil resembling Amber, and occurs in the Coal-measures.

292. A small cubical mass of a black lustrous substance from the Albert coal-mines of Hillsborough, New Brunswick, known as *Albert Coal*. It has a perfectly uniform structure, and sections examined microscopically exhibit no trace whatever of vegetable remains; they are exceedingly brittle and have all the characters and general appearance of very black glass. The absence of all trace of vegetable tissues, which are always

present in coals, would tend to prove that the substance in question is a species of Bitumen, and in order to distinguish it from other substances found in the coal-measures, it has been termed *Albertite*.

Report on the Albert Coal Mine by Charles T. Jackson, M.D., New York, 1851. On the Albert Mine, by J. W. Dawson, Geological Quart. Journ., vol. ix. p. 107. *Presented by Wm. Gillespie, Esq.*

293. A mass of bituminous matter termed *Mineral Pitch*; it is of a dark brown colour, without lustre, and exhibits on all its surfaces the remains of various plants, many of which can be traced into the interior of the substance. When brought in contact with flame, it readily takes fire and burns with a great deal of smoke: sections examined microscopically exhibit no trace of vegetable structure, the plants occurring in it being of recent date, and in no wise concerned in its formation.

From the Pitch Lake of Trinidad.

*Purchased.*

294. Three small rounded nodules of a brownish resin-like substance termed *Copaline*, or *Highgate Resin*; obtained from the London Clay in making a tunnel through Highgate Hill in 1811. It resembles amber in many of its characters, and when in powder is sparingly soluble in alcohol; it burns with a bright flame, giving off a good deal of smoke and a peculiar aroma. It is supposed to be the solid resin of some species of Conifer belonging to the London Clay series.

Annals of Philosophy, vol. ii. p. 9.

From the London Clay of Highgate Hill.

*Presented by John Morris, F.G.S.*

295. A portion of Lignite, the upper surface of which is covered with numerous angular fragments of a resinous substance, very brittle and of a bright yellow colour; it was found upon a hill 1086 feet above the level of the sea; at the base of this hill, coal suitable for steam purposes was discovered.

E. A. Inglefield, Capt. R.N., H.M.S. Phoenix. Times Newspaper, Sept. 15th, 1854. Geological Quarterly Journal, vol. ix. p. 297.

From Atanakerdluk near Disco.

*Presented by James Hilton, Esq.*

296. A portion of a fossil resinous substance of a light brown colour known as *Amber*; all its surfaces have been polished, and an insect resembling a small species of *Phryganea* can be plainly seen imbedded in its substance.  
Locality unrecorded. *Hunterian.*
297. Another thin flat portion of *Amber* of an oval figure, in which a Dipterous insect is imbedded; on one side of the body of the insect a series of rings of colour may be observed—these are produced by a thin film of air.  
Locality unrecorded. *Hunterian.*
298. A rounded mass of transparent and highly polished *Amber*, in which is enclosed a species of Gnat, so perfectly preserved, that with a magnifying power the scales on the wings may be readily seen.  
Locality unrecorded. *Hunterian.*
299. An elongated fragment of *Amber* in which a small Spider is imbedded.  
Locality unrecorded. *Hunterian.*
300. A small flattened piece of *Amber* of rounded figure, in which a Spider of a different species from that of the preceding specimen is imbedded; the greater part of its body is surrounded by a thin film of air.  
Locality unrecorded. *Hunterian.*
301. A small fragment of *Amber* which has been cut and drilled as if for an ornament; on the thinnest edge may be seen a Dipterous insect.  
Locality unrecorded. *Hunterian.*
302. Another fragment of *Amber*, which, like the preceding specimen, has been cut and drilled for an ornament: an insect resembling a small species of *Phryganea* is imbedded in it, but, from being surrounded with a thin film of air, is not clearly seen.  
Locality unrecorded. *Hunterian.*
303. Another drilled fragment of *Amber* in which a Dipterous insect is enclosed: the greater part of the interior of its body has been destroyed, as may be seen by the depression occurring near the thin edge of the specimen.  
Locality unrecorded. *Hunterian.*

304. A small highly polished fragment of *Amber* in which a very perfect Spider is enclosed.  
Locality unrecorded. *Hunterian.*
305. A thin flattened fragment of *Amber* in which as many as sixteen specimens of small Diptera are imbedded.  
Locality unrecorded. *Hunterian.*
306. A specimen of *Amber* of a very bright yellow colour which has been cut and polished so as to resemble a heart; the greater part of it is beautifully transparent, the remainder being opaque and called "fat Amber," the opacity being due to a deposit within it of very minute granular matter.  
Locality unrecorded. *Hunterian.*
307. A round nodulated mass of brown material, looking at first sight like a pebble, but which from its resinous feel is known to be composed of *Amber*; one surface has been polished, but no insects are present.  
Found upon the sea-beach at Konigsberg. *Purchased.*
308. A small heart-shaped specimen of false *Amber* in which a Lepidopterous insect is enclosed. This material, much more transparent than the true Amber, is probably nothing more than Gum Copal; it is very soft and its surface covered with numerous minute cracks.  
Locality unrecorded. *Hunterian.*
309. Another portion of false *Amber* or *Gum Copal* in which a Dipterous insect is imbedded; it is of a darker colour than the preceding specimen and its surfaces are covered with minute cracks.  
Locality unrecorded. *Hunterian.*
310. A large oblong specimen of undoubted *Gum Copal* in which insects of various kinds are imbedded: one of them is a species of Cricket and nearly an inch in length, the others are small Diptera. The surfaces of this specimen, like those of the two preceding ones, are covered with numerous cracks, which are rarely to be seen in true Amber.  
From Africa. *Presented by Dr. A. L. Peirson of Salem, Massachusetts.*

311. A series of small cubical fragments of a transparent resinous material said to be *Gum Anime*, in each of which two or more insects are imbedded, most of them belonging to the order Diptera.

Said to be from Cayenne.

*Purchased.*

312. A small irregular mass of bituminous material of a dark brown colour and soapy feel, which readily melts in the flame of a candle and drops without taking fire. When held in the hand it becomes soft, very like a piece of wax.

From the coal-measures of Torbane Hill, Bathgate, N. B.

*Presented by Wm. Gillespie, Esq.*

313. A mass of bituminous material termed *Resino-asphalte*, which when thin is of a bright yellow colour and readily breaks up into small angular pieces like resin; it takes fire very readily and burns without giving off much smoke.

From the coal-measures of Labuan, Borneo.

*Presented by T. Rupert Jones, Esq., F.G.S.*

## VEGETABLE PRODUCTS.

### COAL.

ONE of the most abundant and at the same time most important of the vegetable productions found in a fossil state, is the substance called Coal, which is generally defined in geological works as "an opaque combustible mineral of a black or brown colour," and the strata in which it is found are termed Carboniferous or the Coal-measures. Coal occurs in seams of variable thickness, being in some instances not more than a few inches, whilst in Staffordshire, at the Tividale Colliery, the total thickness of one of the lowest beds, with no intermixture whatever of sediment, is 29 feet. There are four kinds of Coal in common use; these are termed Caking Coal, Splint Coal, Cannel Coal, and Anthracite: for domestic purposes the Caking Coal is the one generally employed. Brown Coal, Wood Coal, and Lignite, are names given to imperfectly formed or half-bituminized Coals, mostly occurring in the tertiary formations; in all such, the woody structure is more or less distinctly seen, whereas in the true or bituminized Coals, from their having undergone partial liquefaction, traces of it only are preserved. All the Coals used for household purposes exhibit more or less of a laminated structure, the laminæ being parallel and occurring in the same plane as the seam occupied in the earth. If a cubical portion of Coal be held with the laminæ in a horizontal position, the upper and under surfaces will in most cases be found covered with a black fibrous layer, almost entirely made up of the remains of plants converted into Charcoal, which readily breaks up into a fine powder and soils the fingers. This layer, in all the specimens of Coal hereafter to be described, will for the sake of distinction be termed the Charcoal layer, and the plants of which it is composed, as far as has hitherto been ascertained, are totally different from those of which the true bituminous Coal itself is formed. Some Coals readily split up into laminæ on account of the abundance of these layers of carbonized plants.



Very little has hitherto been done by Geologists to endeavour to determine the structure of the material of which Coal is formed, by examining thin sections of it microscopically; hence, although its vegetable origin is now rarely, if ever doubted, the prevailing opinion is, that it is made up of a mixture of various kinds of plants. In the course of the formation of the present Catalogue, however, upwards of 200 specimens of Coal have been examined, not obtained from the same source, nor confined to those from Great Britain, nor even to the same strata, the majority being from the ordinary Coal-measures, while some few are from the Oolite, others from the Chalk and several from the Wealden formation, and without a single exception, more or less of one peculiar structure has been found common to the whole; and it is a remarkable fact, that every section taken in the plane of the laminæ exhibits a tissue which, for want of a better name; may be termed cellular, whilst those made at right angles to the laminæ are totally different and exhibit a structure which, by way of distinction, may be termed fibrous. The so-called cellular structure found in sections made in the plane of the laminæ, is produced by the presence of ring-like markings having a yellow margin and a black centre; the fibrous structure seen in the sections made at right angles to the laminæ, is due to elongated markings mostly of fusiform figure, and made up of the same amber-coloured substance as the rings, with a dark line running nearly their whole length. These peculiar structures are best seen in Cannel Coals, but traces of them are even visible in Anthracites, whilst in the most valuable coals for domestic use obtained from the coal-fields in the North of England, the same tissue is present, and occurs in detached masses imbedded in what appears to be structureless bitumen; but the finest example of all, has been found in a specimen of Lignite from the south shore of Liddon Gulf, Melville Island. This specimen resembles a block of wood, and would tend to show that the markings observable in Coal are probably those of Wood also, a point that is further corroborated by other specimens previously described in the Catalogue, especially one belonging to the Hunterian Collection, and numbered 116.

The microscopic structure of Coal was first briefly described by Mr. Witham, in his work on the "Fossil Vegetables of the Carboniferous and Oolitic deposits of Great Britain"; in 1838 the subject was further investigated by Messrs. Lindley and Hutton, and an account given in the 2nd vol. of the "Fossil Flora";

but the most recent and careful observations on the intimate structure of the principal Scotch Coals are those by Dr. James Adams of Glasgow, who clearly points out the differences between sections made in the plane of the laminæ and those at right angles to it.

SERIES I.—*Coals termed Brown Coals or Lignites, in all of which the woody structure is visible\**.

314. A mass of vegetable matter called Brown Coal ; it is composed principally of leaves and stems, with an occasional intermixture of seeds and husks, which are said to be those of an extinct species of Grape.

From Germany.

*Presented by Dr. Daubeny, F.R.S.*

315. A small cubical mass of Brown Coal brought from the Arctic Regions by Lieut. Pym, R.N., showing very distinct evidences of lamination on some of its surfaces, and of conchoidal fractures on others. When examined microscopically, this specimen presents all the minute characters of corresponding sections of true bituminized coals ; the section in the plane of the laminæ exhibits the amber-coloured rings, and those at right angles to it, a fibrous structure. This specimen throws more light on the nature of coal than any other in the collection.

From the south shore of Liddon Gulf, Melville Island.

*Presented by Sir R. I. Murchison, F.R.S.*

316. A thin flat portion of Brown Coal or Lignite, which readily splits into laminæ and will even split transversely to the grain, on the application of a slight force. Two of its fractured surfaces have a jet-like appearance. Sections have been made in three directions, and all show that the wood was originally coniferous, the bordered pores being very plainly seen on many of the fibres.

From Vancouver's Island.

*Purchased.*

\* Specimens of Lignite and Jet have been already described in the early part of the present volume, *vide* Nos. 106 to 116.

317. Another specimen of Brown Coal or Lignite from the same locality as the preceding one; two of its surfaces are slightly curved, and covered with a light sandy material, which has even entered into several very minute fissures in the substance of the wood. Sections have been made in three directions, and in all, the woody structure is perfectly preserved; the wood was evidently coniferous, but not of the same species as the last-described specimen.

From Vancouver's Island.

*Purchased.*

318. A cubical mass of Brown Coal known as *Bovey Coal*; it occurs in layers varying in thickness from one foot to three feet, and there are as many as eighteen or twenty layers in a depth of 120 feet; the alternating strata being clays or marls. It is easily split or cut with a knife, and leaves a quantity of white ash after burning. Sections made in three directions clearly prove that the wood was coniferous.

From Bovey Heathfield, near Chudleigh, Devon.

*Presented by John Quekett.*

319. A specimen of Brown Coal or Lignite, one-half of which presents the same appearances as the Bovey Coal above mentioned, but the other is wholly converted into a black bituminous substance. Sections have been made in three directions, and both the brown and black portions exhibit coniferous structure, and in the transverse section there are traces of the peculiar rounded markings observable in corresponding sections of coal.

From the drift at Botesdale, Suffolk.

*Presented by Caleb Burrell Rose, Esq., F.R.C.S.E.*

320. A small cubical mass of Lignite from the banks of the Rhine, known as Brown Coal; it very much resembles Bovey Coal in external appearance, and like it the sections exhibit a structure characteristic of coniferous wood.

From the brown coal formations of Germany.

*Presented by John Morris, F.G.S.*

SERIES II.—*Coals called Cannel or Parrot Coals, in all of which the fracture is more or less conchoidal, and the peculiar tissue characteristic of Coal, visible in every part.*

321. A cubical mass of Cannel or Parrot Coal, having a jet-like appearance, and capable of receiving a high polish on one of its surfaces; the kind of fracture termed conchoidal is very evident. Sections have been made of this specimen in three directions, and the one taken in the plane of the bedding exhibits the amber-coloured rings in the greatest perfection, the other two having a fibrous appearance.

From the coal-measures of Wigan, Lancashire. *Purchased.*

322. An oblong block of Cannel Coal, very much resembling the preceding specimen in general appearance; at first sight no trace of lamination is visible, but on a careful examination near the small end, laminæ are distinctly seen, and sections taken in this direction show most distinctly the amber-coloured rings, whilst those at right angles exhibit a fibrous appearance. The only difference in structure between this specimen and the preceding one is, that the fibres appear larger and less compressed.

From the Ferryhill pit, Durham. *Presented by Mr. John Jameson.*

323. A small fragment of Cannel Coal, showing very clearly the conchoidal fracture; it is exceedingly hard, and less lustrous than the Durham and Wigan specimens, but on section exhibits the same structure; the amber-coloured rings are most plainly shown.

From the coal-measures of Lesmahagow.

*Presented by George Wilson, Esq., M.D.*

There are many varieties of Cannel Coal in Scotland, some of the best of which approach those of Wigan and Durham, whilst others more nearly resemble shales, but in all, even in those known as Brown and Black Methil, from Methil in Fifeshire, more or less of the structure before alluded to is exhibited.

324. A small square block of Cannel Coal of a rather browner shade, and more compact than any of the preceding specimens ; one of its flattened surfaces is impregnated with earthy matter, which gives it a gritty feel, and one of the edges shows very clearly the conchoidal fracture. Sections have been made in three directions, which, on microscopic examination, show that the material of which the coal is composed, is the same as that of similar kinds of coal found in Great Britain ; the only perceptible differences being, that in the section taken in the plane of the bedding of the coal, there is more earthy matter present, and the wood throughout appears to have undergone a greater amount of compression. A Cannel Coal from Illinois exhibits the same characters as the preceding specimen, but the rings are rather larger.

From the district of Lake Superior. *Presented by Dr. Walbank.*

325. A small fragment of Cannel Coal from Pennsylvania, which in external appearance very much resembles the preceding specimen, but is rather blacker. Sections examined microscopically exhibit the same peculiar structures as other Cannels, but the amber-coloured rings are very much smaller.

From the State of Pennsylvania, United States.

*Presented by Charles Coley, Esq.*

SERIES III.—*Coals resembling Cannels, in which the structure of the wood is plainly seen to be Coniferous.*

326. A small cubical lump of very black Coal, which has all the lustre of Cannel Coal, but is rather more brittle ; the conchoidal fracture however is very evident. Sections have been made in three directions, and the nature of the wood is clearly seen to be coniferous ; the bordered pores can be traced on some of the fibres which have not undergone very much compression.

From Borneo.

*Presented by T. Rupert Jones, Esq., F.G.S.*

327. A large block of Coal, somewhat resembling Cannel Coal in external appearance, but which is impregnated with a considerable amount of earthy matter; in some parts there are evident traces of its having been composed of wood, in others the laminae are very perceptible, but the fracture is conchoidal. All the sections show that the material of which this coal is composed is undoubtedly wood of the coniferous character.

From Christ Church, Canterbury Settlement, New Zealand.

*Presented by Capt. Sir E. Home, Bart.*

SERIES IV.—*Caking Coals, in which the characteristic tissue is nearly obliterated, or only observable in parts.*

328. A cubical mass of Coal, having a lustre very superior to that of Cannel, and a distinctly laminated character. All the sections show in parts a structure somewhat resembling that of the Cannel Coals, but the greater portion of each is made up of what appears to be structureless bitumen. The amber-coloured rings are plainly seen in the section taken in the plane of the laminae.

From Erewash Valley.

*Presented by Mr. J. T. Norman.*

329. A small cubical mass of black shining Coal more brilliant than the last-described specimen; it shows a laminated structure, and, on microscopic examination, all the sections exhibit more or less of the peculiar rings and fibres before alluded to.

From Silkstone.

*Presented by Mr. John Jameson.*

330. Another specimen of the same Coal, having on one of its surfaces a thick layer of a laminated dull coal called Splint; the microscopic appearances presented by the shining portion are similar to those of the last-described specimen, but in the splint the woody structure is very much more apparent.

From Silkstone.

*Presented by Mr. John Jameson.*

331. A cubical block of Coal having a less lustrous appearance than the preceding, although a more valuable coal for domestic purposes ; the laminated structure is plainly seen, and sections taken in the plane of the laminæ exhibit the amber-coloured rings in detached portions, and widely separated from each other : the fibrous structure is also evident in the longitudinal sections, but the greater part of them is made up of a structureless bitumen.

From Walls End (Lambtons).

*Purchased.*

**SERIES V.—Coals, exhibiting remains of Plants as a layer of Charcoal, upon one or more surfaces.**

332. A flattened block of Coal from Haydock, having two of its broadest surfaces coated with a tolerably thick layer of fibrous charcoal of two kinds, one exhibiting fibres characteristic of coniferous wood, whilst the other is made up principally of plain fibres and of fragments of scalariform vessels, belonging in all probability to Ferns. The coal between these layers has a bright shining appearance and exhibits all the well-marked characters of ordinary bituminous coals.

From Haydock, near Warrington, Lancashire.

*Presented by William Wilson, Esq.*

333. A thin flattened portion of Coal, having two of its surfaces covered with a thick charcoal layer ; this will be found to be composed of detached fibrous masses about  $\frac{3}{4}$  of an inch square, and the direction of the fibres of which, is either at right angles or at angles of 45 degrees with each other. When examined microscopically, the remains of vascular tissue will be found amongst the woody fibres, but no trace of this is to be met with in the coal.

From Hartlepool, Durham.

*Presented by John Quekett.*

334. A mass of very compact Charcoal, exhibiting a smooth fibrous appearance ;

it occurred between two, rather thick, laminæ of coal. When examined microscopically, it will be found composed of woody fibres of small size, having fragments of porous vessels attached to them.

From Ferryhill, Durham.

*Presented by Mr. John Jameson.*

335. A much larger portion of the same kind of Charcoal as the preceding specimen, which has fragments of very black lustrous coal adhering to it. When carefully examined, the direction of the laminæ of the coal will be found to be at right angles with the fibres of the charcoal. Sections of the coal exhibit the usual characteristic structure, whilst those of the charcoal present woody fibres and the remains of porous vessels.

From Ferryhill, Durham.

*Presented by Mr. John Jameson.*

SERIES VI.—*Coals, in which there is no Bitumen (Anthracites).*

336. A block of shining stone Coal called *Culm* or *Anthracite*, which is so brittle that sections are with difficulty obtained from it, but still there are slight traces of its being made up of wood, which in all probability, after its conversion into coal, has been subjected to igneous action. The ashes of Anthracite exhibit casts of woody fibres.

From South Wales.

*Presented by Thos. Clarke, Esq.*

337. A series of small cubical fragments of *Anthracite*, forming part of a bed from three to four feet in thickness, cropping out between layers of trap rock. It has a black lustrous appearance, and most of the specimens have one surface marked with the impressions of a small species of *Sigillaria*. Sections examined microscopically, exhibit very evident traces of vegetable structure.

From Cumberland Bay, Kerguelen's Land.

*Presented by Robert McCormick, Esq., R.N., F.R.C.S.E.*



PLATE VII.—*Coal obtained from the same time that was included in the Coal-Reservoir.*

236 A small fragment of bituminous Coal obtained from the Cretaceous deposits of South America. Its structure precisely resembles that of most of the English coals used for domestic purposes.

From Santa Fe de Bogota.

Presented by Professor Emeric Forster, F.G.S.

237 A small fragment of Coal termed *Maui Coal*, from the volcanic deposits of North America, which very much resembles our English coal. Sections examined microscopically show very clearly the vegetable structure, but the wood appears to be slightly different from that occurring in ordinary coals.

From Beaver Pt., Blackheath, Richmond, Virginia, U.S.

Presented by T. Rupert Jones, Esq., F.G.S.

THE END.





